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OF SOUTH AUSTRALIA.

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All communications to be addressed:

"The Editor, Journal of Agriculture, Education Building, Adelaide."

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A. P. BLESING,

Minister of Agriculture.

ACRICULTURAL VIEWS AND COMMENTS.

MISCELLANEOUS.

Agricultural Bureau Conferences—1935.

Murray Lands (East), at Alawoona, Tuesday, October 1st (A. J. Pengilly, Secretary).

Fruit (Non-irrigated), at Lyndoch, Tuesday, November 5th (J. S. Hammat, Secretary, Williamstown).

Each Conference will commence at 10.30 a.m. Members of Branches are invited to submit papers and questions for the agenda of the Conference in their respective districts.

Agricultural Shows.

We have been advised by Secretaries of Agricultural Show Societies that their shows will be held on the following dates:—

North-Western, Crystal Brook, Wednesday, September 4th.
Snowtown, Wednesday, September 11th.
Laura, Wednesday, September 25th.
Eudunda, Wednesday, September 25th.
Gawler, Saturday, September 28th.
Balaklava, Saturday, September 28th.
Waikerie, Saturday, September 28th.
Karoonda, Wednesday, October 2nd.
Streaky Bay, Wednesday, October 2nd.
Murray Bridge, Friday and Saturday, October 4th and 5th.
Cleve, Saturday, October 5th.
Kapunda, Saturday, October 5th.
Peterborough, Saturday, October 5th.
Kadina, Saturday, October 5th.
Jamestown, Wednesday, October 9th.
Loxton, Wednesday, October 9th.
Strathalbyn, Wednesday, October 9th.
Penola, Wednesday, October 9th.
Blyth, Saturday, October 12th.
Moonta, Saturday, October 12th.
Pinnaroo, Wednesday, October 16th.
Saddleworth, Wednesday, October 16th.
Mount Remarkable, Wednesday, October 16th.
Maitland, Wednesday, October 16th.
Kingston, Saturday, October 19th.
Clare, Saturday, October 19th.
Minlaton, Wednesday, October 23rd.
Mount Gambier, Wednesday and Thursday, October 23rd and 24th.
Burra, Wednesday, October 23rd.
Lucindale, Saturday, October 26th.
Southern, Port Elliot, Saturday, October 26th.
Tatiara (Bordertown), Wednesday and Thursday, October 30th and 31st.
Millicent, Saturday, November 2nd.
Kingscote, Thursday, November 7th.
Oakbank, Saturday, November 9th.
Kalangadoo, Saturday, November 16th.
Angaston, Saturday, February 29th, 1936.
Mundalla, Wednesday, March 4th, 1936.
Mount Pleasa t, Thursday, March 19th, 1936.

THE EVENT OF THE YEAR.

Royal Spring Show

September 14 to 21 (inclusive),

7 Days and 7 Nights.

Record Live Stock Entries. Record Trade Displays.

The State's Shop Window.

SEE THE—

Live Stock, Log Chopping,

Military and Police Carnival,

Trotting, Horses-in-Action,

Sheep Dog Trials under Electric Light and a host of other Attractions.

BECOME A MEMBER OF THE SOCIETY.

See everything there is to be seen.

The Subscription is £1 1s. (no nomination fee), entitling the member to one member's ticket and two ladies' tickets for every session the Show is open. Ladies' tickets are transferable and will admit boys under 14 years of age.

There is a Special Grand Stand reserved for members.

Eagle Chambers,
Pirie Street, Adelaide.

HAROLD J. FINNIS,
Secretary.

It is during this period that the trees make maximum demand for nitrogen and, although green crops (especially leguminous) may ultimately contribute towards higher levels of soil nitrogen, there is for some weeks after incorporation of such a green crop, a marked decrease in the soil nitrogen level. For a period, then, trees may be actually nitrogen starved, and it is most undesirable that this period of potential nitrogen starvation should coincide with the period of early growth, flowering, and setting. Duly recognising practical considerations, early ploughing under of the green crop is the best policy.

Grubs in Potatoes.

Pinnaroo Women's Branch asks "What is the cause of grubs getting into potatoes before they are dug."

Reply—The grubs referred to in this query are probably the larvae of the potato moth, which may damage the tubers either before or after harvest. The moth is usually more active in hot and dry seasons.

Spraying the plants in the field does not appear to be of great assistance, but it has been demonstrated that fine mulching of the soil will help to protect tubers from the grub. Soils of a clay nature, if not well cultivated, will crack, and through the tiny fissures thus formed the grub may gain access to the potatoes.

At harvest time, immediately the tubers are exposed, the moth will, in favourable seasons, lay eggs thereon. The eggs hatch within a few days and the larvae enter the tubers. Some experiments carried out by the Victorian Department of Agriculture have shown the effectiveness of "tuberol" (an emulsified oil compound) in preventing damage. If the moth is particularly active at digging time, potatoes should be sprayed with tuberol at a strength of 1gall. in 30galls. of water; this treatment will minimise extensive damage whilst the tubers are stored.

If grubs are already in the potatoes they should be dipped in a tuberol solution of the above strength for 30 minutes. This latter treatment will not affect the tubers in so far as human consumption is concerned.

Upper North Conference. The Wilmington Branch asked "How to make a plum tree bear fruit."

Reply—The tree blooms normally, but sets very little fruit. This indicates that it is probably failing, due to lack of cross-pollination.

The flowers of many plum varieties will not produce fruit if fertilised with pollen of the same variety, and for maximum cropping it is necessary for such flowers to be fertilised by pollen of another suitable plum variety—the exchange of pollen being effected by bees or other insects.

The necessary facilities for such cross-pollination are usually provided by interplanting two or more compatible plum varieties which bloom simultaneously, or whose blooming periods overlap sufficiently to enable cross-fertilisation.

The plum tree in question is of unknown variety, and it is, therefore, impossible to suggest a suitable polleniser until the tree is named. Nevertheless, the inquirer may be able to determine a suitable polleniser in the following manner. When the tree is in bloom, obtain from another plum tree of different variety, and which is also in bloom, several flowering branches; immerse these branches in a tin of water and suspend the bouquet and tin from a limb of the recalcitrant plum tree. This procedure may greatly increase the setting, and, if so, the variety from which the bouquet was obtained may be regarded as a suitable polleniser. If possible, more than one variety may be used and bouquets hung in different parts of the tree. Observation of the amounts of fruit set in the vicinity of the different bouquets will then indicate which is the best polleniser.

Having, in the above manner, decided on a suitable polleniser, permanent cross-pollination facilities may be provided by planting a tree of the pollenising variety alongside the non-bearing tree, or, if preferred, by working one or two limbs of the non-bearing tree to the pollenising variety.

VETERINARY INQUIRIES.

Upper North Conference: "What quantity of carbolic acid and sweet oil is required to make a carboliser to dress wounds on animals?"

Reply—One ounce of strong liquid carbolic acid to 1 pint of olive oil. To be well shaken before application.

"Tantanoola" reports sheep with slimy discharge from mouth, listless, and moves with staggering gait.

Reply—The symptoms described as being shown by the affected sheep point to some form of toxaemia rather than plant poisoning, though from the information given, it is impossible to say the cause of it. Should another case occur, the following treatment might be tried if it can be given in the early stages:—Give the sheep a drench of 10 grains of permanganate of potash dissolved in quarter pint of water. Two or three hours later give quarter pint of raw linseed oil. Subsequently give twice daily on the back of the tongue as much powdered nux vomica as will go on a sixpenny piece.

"Lameroo" has aged mare very shaky in front legs following being allowed to graze in a paddock of self-sown wheat and oats.

Reply—The mare was affected with so-called grass founder. Take her off the grass and feed on dry feed mostly, with only a limited allowance of green feed daily. Give her a drench of raw linseed oil, 1½ pints; turpentine, 4 tablespoons; and subsequently give a clenched handful of Epsom salts night and morning in the feed. Dissolve this in a little water and use it to damp the feed with. Also give 1 tablespoon of Fowler's solution of arsenic in the feed night and morning for a fortnight.

"Secretary Agricultural Bureau, Balumbah," reports horse with severe cut on the inside of hind leg. Bleeding was stopped by tying a piece of silk around the cut artery.

Reply—Provided the wound is clean and the silk ligature was tied and cut off short without leaving long ends, the artery will heal without any further trouble.

"Nott's Well" reports mare 9 years old, discharge from small hole on the bottom eyelid. Matter is also discharging from the nostril.

Reply—The condition present would appear to be one of abscess formation in the sebaceous glands of the eyelid. The discharge through the nose is matter that is coming from the eye down the tear duct, which runs from the eye into the nostril. It would be advisable to call in a qualified veterinary surgeon to attend to the animal, as some surgical interference may be necessary. Failing this, get from the nearest chemist some aqueous solution of iodine (made up to one-quarter the strength of B.P. tincture) and an ounce of 1 per cent. yellow oxide of mercury ointment. Clean out all matter from the eye sac and from the external wound on the lid by bathing with lukewarm boracic lotion. Then gently syringe out the opening of the wound on the outside of the lid with a little of the iodine solution. Finally, place a small piece of the ointment (about the size of a small pea) inside the lower lid, and hold the two lids together with the fingers for a minute or two to allow the ointment to melt and spread over the eye. Repeat the treatment daily.

ALMOND TREES IN IRRIGATION AREAS.

"Caloote, River Murray," asks for information concerning the planting of almond trees. Mr. E. Leishman (District Horticultural Instructor), to whom the inquiry was submitted, says if it is intended to plant the trees on the high land, consisting of a deep, sandy loam over marl or limestone, the conditions should be ideal where irrigation can be carried out. It is essential in this climate in the early years of the trees that they must not suffer from the want of soil moisture. Frequent irrigation in the early stages, say, from two to three years, is necessary to establish the trees. Varieties suitable for the district are Chellaston, Hatch's Nonpareil, and I.X.L.

PASTURE IMPROVEMENT IN SOUTH AUSTRALIA.

[By R. C. Scott, Supervisor of Experimental Work, and E. M. Hutton, Field Officer.]

INTRODUCTION.

The study and application of the principles of pasture improvement are essentia for the most profitable production of animal products, such as wool, meat, and mill especially in high rainfall districts. In general, the higher the rainfall the les suitable is the district to cereal production, and the greater the suitability to inten sive livestock husbandry with pasture improvement as the basis.

For successful pasture improvement in any district, due regard must be pai to choosing the right pasture plants, and the right strains of those plants, t correctly balanced pasture mixtures of those strains, to correct fertiliser treat ment, and above all to the proper utilisation of the pasture growth obtained.

A correctly balanced pasture mixture, which consists of one or more legume grown in association with one or more grasses, is an advantage from the poin of view of fertilising practice and animal nutrition.

Pasture grasses are only productive when plentifully supplied with phosphoru and nitrogen, whereas pasture legumes which obtain atmospheric nitrogen throug the agency of bacteria located in their root nodules need only be supplied wit phosphorus for full productivity. The nitrogen fixed by the bacteria of legume becomes distributed throughout the plant, and so becomes available to the grazin animal, which returns approximately 50 per cent. of this nitrogen to the soil i its droppings. The soil is further enriched in nitrogen when the remains o leguminous plants, especially the root nodules, decay. Thus, for full production a grass-clover pasture needs only adequate annual phosphatic top-dressing an proper management.

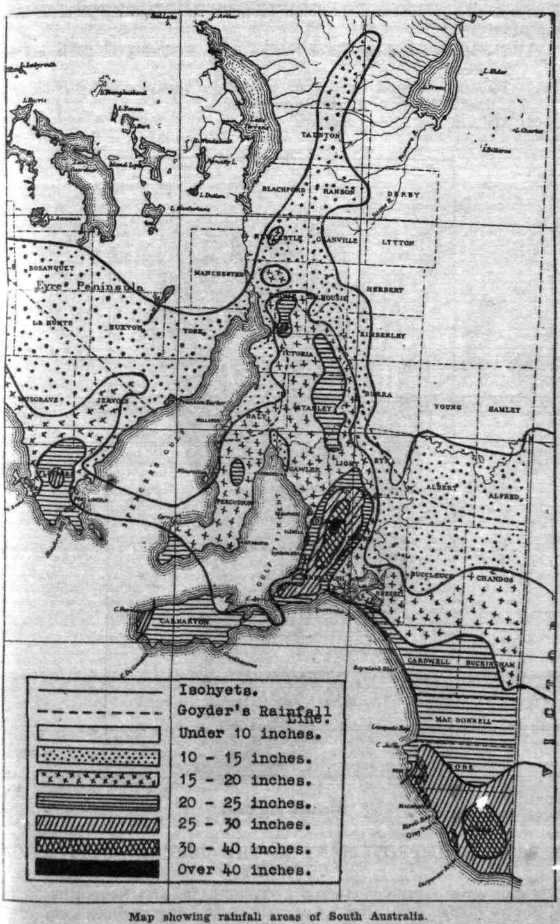
Pasture improvement would be very expensive without legumes, because in thei absence nitrogen becomes a limiting factor to plant growth in the uncultivated area of low to medium rainfall districts, and also in the high rainfall districts due t leaching and conditions unfavourable to the development of nitrogen bacteria.

In recent years it has been found that the mineral content of pastures is just a important as their energy value, so that legumes with their high nitrogen an mineral content need to be properly balanced with grasses in a pasture, to secur best results with the grazing animal.

A. THE PASTURE DISTRICTS OF SOUTH AUSTRALIA.

The South Australian climate has been classed as Mediterranean, that is to sa one in which a period of liberal winter rainfall is succeeded by a summer drough the period of stress coinciding with the period of high temperatures. South Au tralia is the driest State in the Commonwealth, since it has the highest percentag (91 per cent.) of land receiving less than a 15 inch annual rainfall, and the lowe percentage receiving more than this quantity per annum. In addition, South Au tralia has the smallest acreage amenable to intense pasture development, becaus within its boundaries there is a lesser area on which the rainfall exceeds 20 inche per annum than is the case in any other State in the Commonwealth. The 13,00 ...res of Irrigated Murray Swamps in country receiving less than a 15 inch rai ... are certainly a help in making up our deficiency of true pasture land.

... the foregoing it is obvious that if we are to compete successfully with th ...tes in intensive livestock husbandry, we must develop to the fullest exte ... in the areas receiving greater than a 15 inch rainfall. In this co ... necessary to concentrate on the Murray Swamp lands and the area



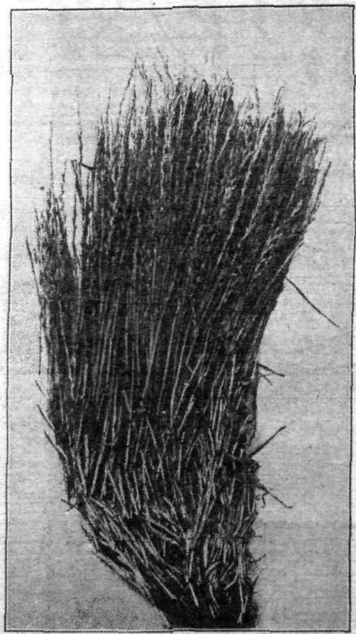
Map showing rainfall areas of South Australia.

recording more than a 20 inch annual rainfall. Trumble and Davies (*Journa Council Scientific and Industrial Research,* August, 1931) have shown that there are three distinct pasture areas in South Australia, each requiring different treatment, namely:—

(1) The winter cereal cultivation belt receiving 15 inches to 25 inches per annum.

(2) The area of relatively liberal or extended precipitation receiving more than 20 inches to 25 inches per annum.

(3) The irrigated Murray Swamps.



Wimmera Rye Grass.

[From Vic. *J. Agric.*]

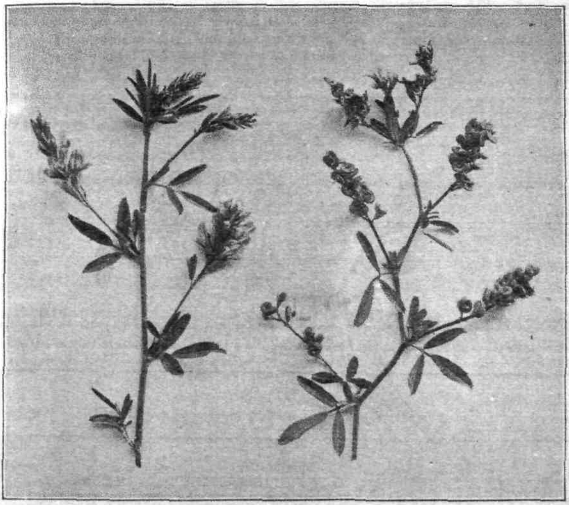
B. PASTURE IMPROVEMENT IN THE CEREAL CULTIVATION COUNTRY.

The main cereal cultivation country is confined to the area between the 15 inch and 25 inch rainfall lines. Here winter rainfall and summer drought are clearly defined. From about the end of April until the end of September liberal and effective winter rains are recorded, this period coinciding with a pronounced drop

in monthly temperatures. From the beginning of October until the beginning of April, the relatively light rainfall is rendered more or less ineffective by the summer temperatures.

In this area pasture improvement must fit in with cereal production, and as a result, must of necessity be mainly of a temporary nature. Where cows and horses are the main animals to be fed, hay, ensilage, and natural grassland fill the requirements. However, with the present low prices of cereals, many farmers have turned more and more to sheep, and consequently pasture improvement is finding a definite place in the farming practice.

In the past, many farmers have found that oats and Superphosphate drilled on to wheat stubbles were one of the best ways of increasing the value of the grazing



Lucerne.

in the year following the wheat crop. Such forage oats can be grazed as green feed, portion being reserved to build up a supply of grain or hay to be fed later. In addition, it is now recognised that the most useful pasture plants in this area are Wimmera Rye Grass, Lucerne, Burr and Barrel Medics, and Evening Primrose, with the addition of *Phalaris tuberosa* and Dwalganup Early Subterranean Clover where the rainfall is 18 inches or more. However, *Phalaris tuberosa* would only be used when a permanent pasture is thought desirable.

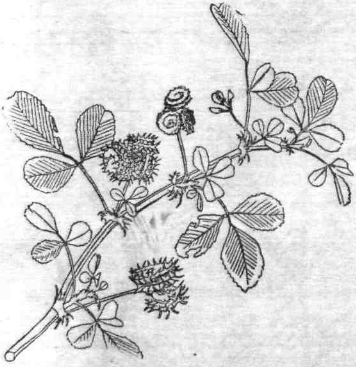
I. The Main Characteristics of the Pasture Plants Important in the Cereal Cultivation Country.

WIMMERA RYE GRASS (*Lolium* sp.).—This is a free seeding annual forage plant very well adapted to temporary pasture conditions in the cereal cultivation country. It is very palatable and nutritious, even when dry. It is sown with the first autumn

rains and develops during the winter and spring, the greatest bulk of growth being made in the spring. McDougall strain is reliable seed to purchase. There are about 200,000 seeds in a pound. The price varies between about 4½d. to 6d. per pound.

LUCERNE (*Medicago sativa*).—This is a drought-resistant perennial legume particularly well suited to the relatively dry conditions of the cereal belt. It thrives best where underground water is within reach of its deep taproot system, or where irrigation can be practised. In addition, sufficient lime in the soil is necessary for development. It is especially valuable because its main period of growth is during the summer. It is only of use where a permanent or three or four year pasture is desired. Lucerne seed is about 1s. 6d. to 2s. per pound, 220,000 seeds being in a pound. The best variety is the Australian lucerne, of which the strain known as Hunter River is typical.

BURR MEDIC (*Medicago denticulata*) and BARREL MEDIC (*Medicago tribuloides*). —These are very important naturally occurring annual legumes, particularly in the drier parts of the cereal cultivation country. They build up nitrogen in the



Burr Medic.

[From Leaflet No. 6, N.Z. Dept. Agric.]

soil, and provide abundant winter and spring feed, particularly if stimulated by topdressing with superphosphate. The burrs provide nutritious summer feed. The price of seed approximates 1s. per pound.

EVENING PRIMROSE (*Oenothera odorata*).—This is a biennial with a deep taproot system. It is particularly valuable because it will produce nutritious fodder on very poor sandy soil, which is practically useless for cereal cultivation. It is sown with the first autumn rains, and the main growth is made during the spring and summer months. The seed is about 2s. 3d. per pound.

PHALARIS TUBEROSA.—This is a valuable drought-resistant perennial fodder with a root system which penetrates deeply into the subsoil, but needs at least an 18 inch rainfall for persistence. It produces feed with the first autumn rains, and the winter production is good compared with other pasture plants, which tend to make the bulk of their growth in the spring. It is very resistant to grazing. *Phalaris tuberosa* is sown in the autumn, and although making rather slow growth in the first season, improves considerably in the second year. It is very susceptible to weed competition in the seedling stage. Being a perennial, it does not fit in well with cereal rotations, so should only be planted if seed production or a permanent

pasture is the aim. Seed commands about 5s. per pound, 300,000 seeds being in a pound.

DWALGANUP EARLY SUBTERRANEAN CLOVER (*Trifolium subterraneum*).—This is the best associate clover, especially on sandy soils, for Wimmera Rye Grass, Evening Primrose, and *Phalaris tuberosa* where the yearly rainfall is 17-18 inches or more. It is an annual with a prostrate habit and ability to bury its seeds. It is sown in autumn and makes the bulk of its growth in late winter and spring. This strain of Subterranean Clover flowers early (August) and is able to set its grain before the hot dry summer weather affects development. At present the seed is about 1s 6d. per pound, there being approximately 70,000 grains to a pound.

II. The Main Divisions of the Cereal Cultivation Belt.

The three main divisions of the cereal cultivation belt are:—

1. Areas receiving less than a 17-18 inch average annual rainfall.
2. Areas receiving from 17-25 inch average annual rainfall.
3. Areas with ground water close to the surface.

Evening Primrose.

[From Black's *Flora S. Aus.*]

The Lower Rainfall Mallee Areas.

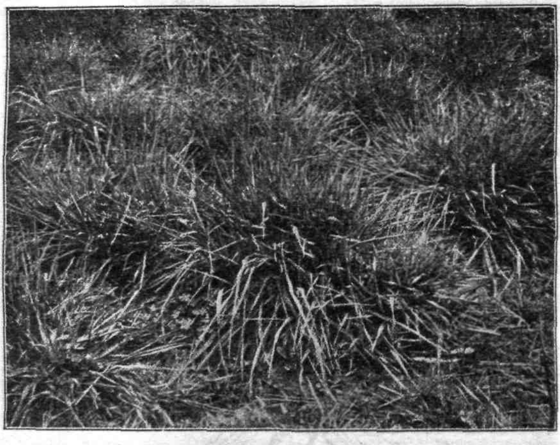
Poor sandy rises which have not been so denuded of vegetation as to be subject to drift can be made to provide quite an appreciable amount of valuable sheep feed if 1lb. of Evening Primrose (*Oenothera odorata*) and not less than ½cwt. of Superphosphate is broadcasted over each acre at the time of the first autumn rains. Annual dressings of Superphosphate will not only keep up the productivity of the Evening Primrose, but will encourage the Burr and Barrel Medics (sometimes wrongly called Burr "Clover").

On land used for cereal production, Wimmera Rye Grass (*Lolium* sp.) may be planted instead of forage oats to improve the pasture in the grazing year following a wheat crop. Wimmera Rye Grass can easily be established by sowing about ½lb. per acre of the seed mixed with the superphosphate when the wheat crop is drilled in. A light seeding such as this will not compete seriously with the

cereal plants. At harvest time the Wimmera Rye Grass seed gathered by the machine will be blown out of the back of the harvester to provide a relatively heavy seeding for the next year.

Adequate phosphate dressings stimulate the Burr Medics, which not only produce a good bulk of fodder, but also build up soil nitrogen which is necessary for the best development of Wimmera Rye Grass. If the area is to be left out to pasture for two years, at least one topdressing of Superphosphate and a cultivation with the first autumn rains is essential. Spelling the Wimmera Rye Grass in late spring to allow of seed setting may be necessary where there is likelihood of it being eaten out. Wimmera Rye Grass, together with the burrs of the Medics, form excellent dry feed for stock in the summer months.

Wimmera Rye Grass is never likely to become an aggressive competitor of wheat crops, because it can be readily kept in check by a clean fallow. In districts where Takeall is bad, the displacement of Barley Grass by Wimmera Rye Grass



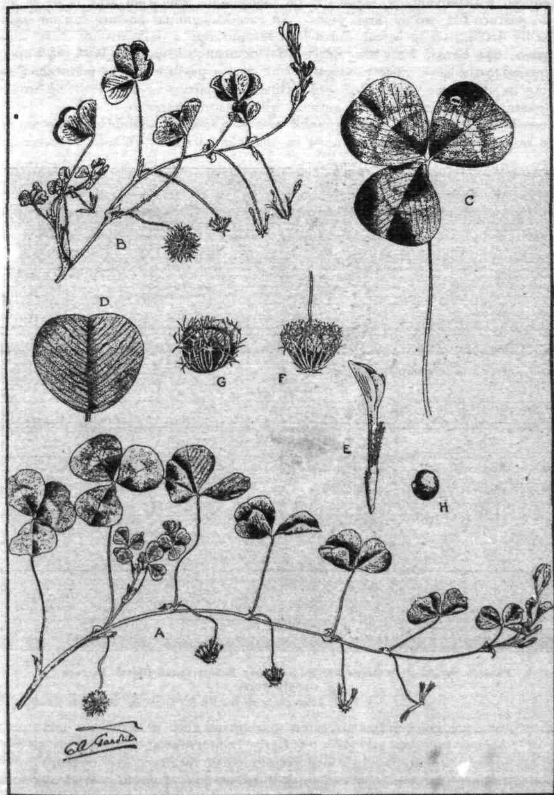
Phalaris tuberosa showing winter development.
[From C.S.I.R., Bull. 66, by A. E. V. Richardson, M.A., D.Sc., H. C. Trumble, M.Agr.Sc., and R. E. Shapter, A.A.C.I.]

in pasture land (apart from the added feeding value) is a great advantage, since the former is susceptible and the latter non-susceptible to the disease.

The growing of Lucerne may be profitable in these areas if the pasture land is left out for at least three or four years. On the light sandy mallee soils which are liable to drift 4lbs. Lucerne seed and ¾cwt. Superphosphate distributed through the manure box on to a cereal stubble in the autumn is the best method of establishment, whilst the addition of 1 to 2lbs. of Wimmera Rye Grass will greatly increase the pasture production. On heavy soils bare fallowing for a whole season with cultivation and cultipacking is essential for success. Under these conditions about 6lbs. Lucerne seed (and 1 to 2lbs. of Wimmera Rye Grass if desired) with 1cwt. Superphosphate drilled shallowly through the manure-box in autumn would produce a good pasture.

Wheat Growing Areas Receiving 17-25 Inches Annual Rainfall:

On very poor sandy soils which are not suitable to cropping, a good mat of feed would be produced from a mixture of 1lb. Evening Primrose and 2 or 3 lbs.



Western Australian Early Subterranean Clover. A and B—Showing habit and development. C—Leaf, showing cream arches. E—Flower. F—Maturing seed head. G—Ripe burr with 3 pads. H—Seed.

[From W.A. *J. Agric.*]

of Early Subterranean Clover and about 1cwt. Superphosphate per acre drilled through the manure-box. Annual topdressing at the rate of a bag of Superphosphate to 2 acres is necessary to keep up the productivity of the pasture.

On the better class land 8lbs. of Lucerne seed, with or without 1 to 2lbs. of Wimmera Rye Grass, sown with 1cwt. of Superphosphate after adequate preparation, will produce a good pasture. Dwalganup Early Subterranean Clover can be introduced with advantage, especially on sandy soils, where an area is to be left out to pasture for two or three years. An excellent annual pasture can be established by drilling on to cereal stubbles in the autumn a mixture of 2 to 3lbs. Wimmera Rye Grass, 3 to 4lbs. Early Subterranean Clover, and 1cwt. of Superphosphate to the acre. The productivity of such a pasture can be maintained by spelling in late spring to allow of seed setting, by topdressing with 1cwt. of Superphosphate, and cultivating each autumn with pasture harrows.

Since *Phalaris tuberosa* is a perennial pasture plant, it should not be established on land which is to be cropped in the near future. Where a perennial

Phalaris tuberosa—**Western Australian Early Subterranean Clover Pasture at Gepp's Cross.**

[By courtesy of H. C. Trumble, Waite Institute.]

pasture producing good autumn, winter, and spring feed is desired, a mixture of 3lbs. of *Phalaris tuberosa* and 4lbs. of Early Subterranean Clover with at least 1cwt. of Superphosphate per acre will give excellent results. This mixture should be seeded in early autumn on a well-worked fallow free of weeds. With perennial plants like *Phalaris* an even stand over the surface of the land is desirable. This can be obtained by removing the drill tubes and allowing the seed to fall on a sloping board fixed below the seed runs, the seed being covered by light harrows attached behind the drill. During the first year the pasture should be lightly grazed to reduce weed competition. After that, however, *Phalaris tuberosa* will withstand heavy grazing without damage, but for full productivity, at least 1cwt. of Superphosphate should be applied annually. This not only encourages the *Phalaris tuberosa* directly, but also indirectly, because of the nitrogen made available following the stimulation of the associate Early Subterranean Clover.

As *Phalaris tuberosa* seed averages about 5s. per lb., seed production is often a profitable side line. If seed or hay is the aim, spelling the pasture from mid-spring is desirable. Harvesting is carried out when the top of the seed head is ripe. It will be found that various modifications of the harvesting machinery are required to prevent loss of seed, and a fair return appears to be about 100 to 120lbs. per acre.

To make nutritious hay from *Phalaris tuberosa*, it must be cut just when the flower-heads begin to appear. If cut too late, the hay is coarse, light, and unpalatable.

Cereal Areas with Ground Water Close to the Surface.

In these areas, with underground water within 4 to 12 feet of the surface, as between Burra and Mannanarie, Lucerne growing and Lucerne seed production is profitable, good stands sometimes lasting for 30 years.

On the heavy soils of the Northern flats the land must be thoroughly prepared, and if weedy, it should be ploughed in early winter and treated as bare fallow until seeding in the following autumn. If the land is relatively free from weeds, winter ploughing with several cultivations would prepare the soil for a spring seeding while the soil is moist. In either case cultipacking of some kind is essental to produce a good seed-bed. In seeding, 12lbs. of seed and 2cwts. of Superphosphate should be mixed and shallowly drilled through the manure-box on each acre. On the other hand, the seed and manure can be broadcasted over the surface, and then lightly harrowed in. On light sandy soils liable to drift, as around Lake Albert, 9lbs. of seed with 1 to 1½cwts. superphosphate per acre, mixed and drilled on to a cereal stubble in the autumn is preferable to sowing with a cover crop. Cover crops, such as oats, are undesirable, since they compete for plant food and light with the lucerne and tend to crowd out and weaken plants grown in association with them.

Where lucerne is grown mainly for grazing in this cereal area, a mixture worthy of trial consists of 2 to 4lbs. of *Phalaris tuberosa*, and 6 to 8lbs. of Lucerne sown in the autumn on a well-cultivated and cultipacked fallow. The seed should be mixed with a dressing of 1½ to 2cwts. of Superphosphate per acre, and provision made for even distribution behind the drill. Such a pasture should be judiciously grazed during the first year. With a Lucerne or Lucerne-*Phalaris* pasture which is to be permanent, an annual autumn topdressing of 1½ to 2cwts. of Superphosphate and the subdivision of the area into small paddocks of not more than approximately 20 acres will greatly increase the carrying capacity. In addition, permanent lucerne pasture benefits appreciably from a July or August cultivation, a rigid tine cultivator with narrow shares being used, whilst on light sandy soils a good harrowing will answer the purpose.

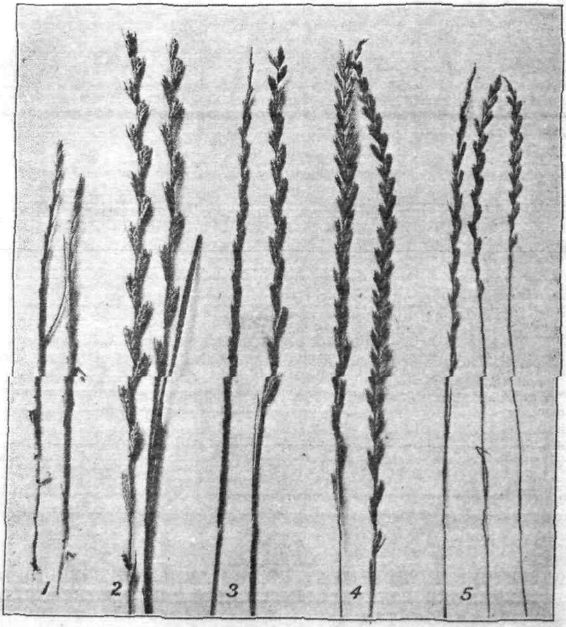
C. PASTURE IMPROVEMENT IN THE AREAS OF LIBERAL OR EXTENDED RAINFALL INCLUDING THE SUBTERRANEAN CLOVER COUNTRY.

This area is characterised by cool temperate spring and early summer conditions due to either a heavy or extended rainfall. Of the cereals, oats do well in this environment, but for the most part such localities are entirely unsuited to the ordinary cropping as practised in the Northern districts of South Australia. The area receiving mild, moist, early summer weather is practically confined to the Mount Lofty Ranges, together with the Mid and Lower South-Eastern districts of the State. Pasture production in all its phases is the most profitable agricultural practice for such lands.

The pasture plants most suited to these areas are Wimmera Rye Grass, Perennial Rye Grass, *Phalaris tuberosa*, Mount Barker Subterranean Clover, White Clover, Strawberry Clover, and in special cases Yorkshire Fog.

The Main Characteristics of the Useful Pasture Plants in the Liberal or Extended Rainfall Areas.

WIMMERA RYE GRASS (*Lolium* sp.).—The main characteristics have been mentioned previously. This grass can be grown with success anywhere, except under waterlogged conditions. With Subterranean Clover, it forms the ideal mixture for bracken fern areas.

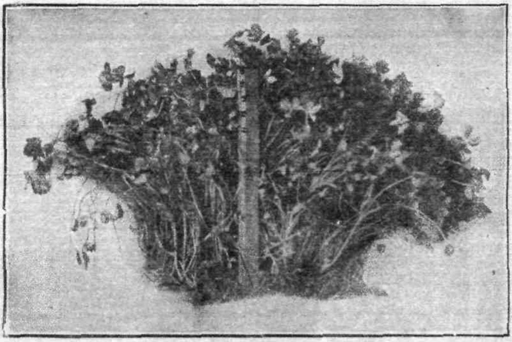


Species of Rye Grass. (1) Rigid Rye Grass (*Lolium rigidum*). **(2) Drake Grass** (*Lolium temulentum*). **(3) Wimmera Rye Grass** (*Lolium sp.*). **(4) Italian Rye Grass** (*Lolium multiflorum*). **(5) Perennial Rye Grass** (*Lolium perenne*).
[After F. R. Drake, Vic. *J. Agric.*]

PERENNIAL RYE GRASS (*Lolium perenne*).—This is the most valuable perennial ss for temperate conditions. It is very resistant to grazing, and will produce nutritious feed most of the year if moisture is available. For productivity ersistence, it needs rich, dark soils high in nitrogen. It is an ideal grass ing conditions. Sowing with the first autumn rains is the best procedure.

Each pound of seed contains about 250,000 seeds, and a pound costs about 7½d. It is always best to buy certified perennial seed, since many of the uncertified strains are short-lived and non-persistent under grazing. The best strain at the present time is New Zealand Certified Perennial Rye Grass. In addition there are many local strains of Perennial Rye Grass which have persisted for a long period in the Adelaide Hills, and other parts of the State, and if these strains were developed, supplies of seed from good type plants suited to South Australian soil and climatic conditions could quickly be made available.

PHALARIS TUBEROSA.—The characteristics of this valuable grass have been mentioned previously. It will persist on both first and second class soil, but yields more palatable and a greater quantity of fodder when planted on the former type. It is not as palatable as Perennial Rye Grass in the green state, but when made into hay is relished by stock. Like Perennial Rye Grass, it will produce



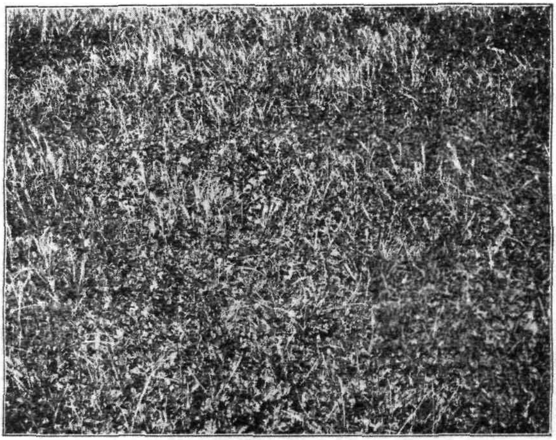
Mount Barker Late Subterranean Clover.
[From *Fodder Crops for Australia*, L. H. Brunning.]

green feed most of the year. It should be sown in the early autumn on a well-prepared piece of land free from weeds. A light dressing of Subterranean Clover may be added to the mixture, but Perennial Rye Grass should not be included, as it has a strong depressing effect on the establishment of *Phalaris tuberosa.*

LATE SUBTERRANEAN CLOVER (*Trifolium subterraneum*).—This is the standard clover for the large area of land situated in the cool temperate districts of South Australia. On rich black soils which are highly charged with lime, such as are to be found in parts of the South-East, Subterranean Clover does not thrive, its place being taken by Strawberry and White Clovers, but, on the other hand, it makes strong abundant growth on low fertility soils, provided that adequate phosphatic manures are added and must be regarded as the most valuable pasture variety in this State. Because of its seed-burying habits it is very persistent, and with the assistance of superphosphate is capable of transforming poor sandy soils into dark friable land, which in the course of time becomes suitable for carrying Perennial Rye Grass. Subterranean Clover can be established on land which is still only partially cleared, since further tillage in the autumn to destroy the bushes or eradicate stumps will not affect the germination of the seed which is lying dormant in the ground at that time of the year.

It should be sown in the autumn, and whilst responding to good tillage, a sound soil preparation is not so essential as is the case with many other varieties, provided that the seed is buried. A pound contains 70,000 seeds, and on the local market costs about 1s.

WHITE CLOVER (*Trifolium repens*).—White Clover is only suited to rich soils which are moist during the spring and summer months, since it makes its maximum growth during this period. There are many rich moist pockets of land in the Adelaide Hills which grow White Clover very well. It is a perennial with a creeping, rooting stem. Because of its smooth palatable leaves it is often badly



Perennial Rye Grass—Late Subterranean Clover pasture at Mount Barker.

attacked by Lucerne Flea. The price of certified seed is about 3s. 6d. a pound, each pound containing approximately 730,000 grains. New Zealand Certified Wild White Clover is a good strain to purchase.

STRAWBERRY CLOVER (*Trifolium fragiferum*).—This is a very palatable perennial clover with rooting stems, which makes its growth in the spring and summer. It is particularly adapted to marshy localities and rich swampy low-lying land. On the black partially drained soils of the South-East Strawberry Clover has been found to thrive extremely well. A pound of seed is about 6s. This clover contains about 90 per cent. hard seeds, and unless the grain is rubbed between two large sheets of emery paper or some similar substance, the germination may be very poor. Sowing at a very shallow depth in the autumn will give the clover a chance to become well established and withstand the first summer.

YORKSHIRE FOG (*Holcus lanatus*).—This soft hairy perennial grass is a useful pioneer on raw peat and poorly drained areas where the rainfall is liberal and extended. Stock have to acquire a liking for it, and its feeding value is lower than that of Perennial Rye Grass. The price of seed is 6d. a pound, each pound containing approximately a million seeds.

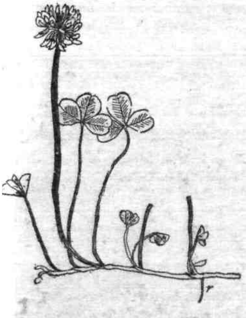
The Main Pasture Divisions in the Liberal or Extended Rainfall Areas.

In these areas, soil fertility, and not rainfall, is the main factor governing the direction which pasture improvement will take. Taking this into consideration, the main pasture divisions are:—

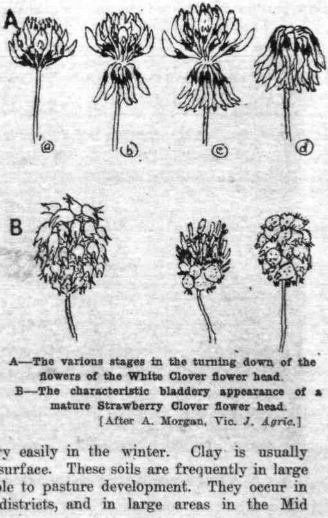
1. Gray and white sands, gray and red sandy loams, and poor gravelly soils. Ironstone patches are a common occurrence in these soil types. They are found commonly in the Adelaide Hills and portions of the South-East, the red sandy loams being practically confined to the latter area.

2. Red shotty ironstone in large areas, such as on Kangaroo Island.

3. Gray loams, which are often greasy and sticky at the surface when wet. These are found in the apple growing areas of the Adelaide Hills, and in the country through to Victor Harbour.



Portion of white clover plant showing creeping habit of stem and root "r."
[After Percival.]



A—The various stages in the turning down of the flowers of the White Clover flower head.
B—The characteristic bladdery appearance of a mature Strawberry Clover flower head.
[After A. Morgan, Vic. *J. Agric.*]

4. Gray silty soils which puddle very easily in the winter. Clay is usually found within 9 inches or a foot of the surface. These soils are frequently in large flat areas, and are particularly amenable to pasture development. They occur in the Meadows, Echunga and Myponga districts, and in large areas in the Mid South-East, as at Kybybolite.

5. Old Subterranean Clover land, as at Mount Barker.

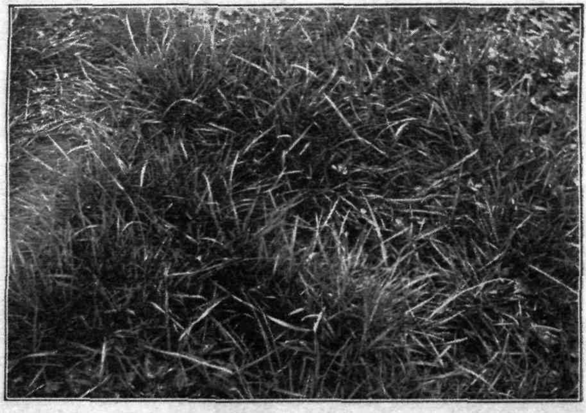
6. The drained black lands of the South-East, as between Millicent and Naracoorte.

7. Moist dark flats, peaty swamps, and marshy localities. The two former are often found in gullies of the Adelaide Hills.

Pasture Development on the Poor Gray and White Sands, Gray Sandy Loams, and Poor Gravelly Soils.

With these soil types the main aim should be to increase the organic matter, and so improve their water and nutrient retaining powers. Many of these areas are only just being cleared and opened up, due no doubt to present economic

conditions. The cheaper the cost of clearing and establishment the better. On heath country the usual procedure is to roll and burn all undergrowth and small eucalypts, the larger eucalypts being hand-cut or rung. Yacca plants can be eradicated in the winter by pouring kerosene into the heart of each plant. About 8galls. kerosene will treat 1,000 yacca plants. (R. Hill, *S.A. Journ. Agric.*, Jan., 1931.) When the land is relatively clear, a shallow but thorough cultivation to stir up the surface layers is beneficial. If the soil is deeply ploughed, the thin layer of organic matter and soil nutrients in the top portion would be buried, and raw unproductive soil exposed. The area should then be sown in the autumn with 3lbs. or 4lbs. of Mount Barker Subterranean Clover and 2cwts. of Superphosphate per acre and the seed properly buried by harrowing. In big gum country the addition of 3lbs. to 4lbs. of Wimmera Rye Grass to the mixture would be an economic proposition. In general, these poorer soils do not develop clover well until the second or third year, and it is probably advisable to wait until then before Wimmera Rye Grass is introduced. These converted virgin areas should be regularly hand-grubbed until no more gum shoots, &c., appear. Annual autumn



A good pasture mixture comprising Perennial Rye Grass and White Clover.

harrowings, and topdressings of at least one bag of superphosphate per acre, are essential for full development of the clover. After about eight to ten years the soil is frequently darkened in colour, when Perennial Rye Grass may be introduced. When adding the Perennial Rye Grass the soil should receive a good autumn cultivation, 5lbs. or 6lbs. of Perennial Rye Grass then being broadcasted and harrowed in, or drilled in shallowly with the Superphosphate.

Bracken fern areas can be cut with a mower, and then given a good cultivation or shallow ploughing in readiness for sowing. In the autumn 5lbs. or 6lbs. of Wimmera Rye Grass and 4lbs. or 5lbs. of Mount Barker Subterranean Clover with 2cwts. of Superphosphatee can be drilled on to the land each year. Such areas need a topdressing of at least one bag of Superphosphate to the acre together with a harrowing. Stock grazing on such pastures are continually break- the young bracken shoots, and the fern is gradually eradicated.

Pasture Development on Red Shotty Ironstone Country.

Areas of this country occur throughout the Adelaide Hills, and particularly on Kangaroo Island. This type of soil is necessarily costly to develop, because of its lack of organic matter, coarseness of particles, and its large phosphatic requirement. On Kangaroo Island its use for grazing is a necessary adjunct to successful stock-raising, since the herbage it carries cures the coastiness developed on much of the other country in the vicinity.

To develop shotty ironstone country, 4lbs. or 5lbs. of Ordinary Subterranean Clover with 2cwts. of Superphosphate per acre should be drilled in or broadcasted and harrowed after a good autumn cultivation. Every autumn liberal dressings of at least a bag of Superphosphate per acre, together with a good cultivation, will keep up the productivity of the pasture. After three or four years 5lbs. or 6lbs. of Wimmera Rye Grass per acre could be introduced with the autumn cultivation and topdressing. As previously mentioned, the permanence of a Wimmera Rye Grass-Subterranean Clover pasture depends on autumn cultivation, topdressing, and spelling in late spring to allow for good seed setting.

When the shotty ironstone soil has been developed for a number of years, it may be possible to establish *Phalaris tuberosa* successfully.

A well built stack of grass hay.

Pasture Development on Gray Loams which are often Sticky at the Surface when Wet.

These soils are fairly fertile, the main drawback being their stickiness in the winter. As a result they are rather cold, and pasture growth is very slow during the winter. By establishing Subterranean Clover, the stickiness disappears as the organic matter in the surface layers is built up.

These sticky gray loams should receive a thorough cultivation in the autumn before a pasture is sown. A good pasture mixture for each acre would be 4lbs. Mount Barker Subterranean Clover, 6lbs. Wimmera Rye Grass, and 1 bag of Superphosphate. The permanence of the Wimmera Rye Grass will depend on correct pasture management on the lines which have been already outlined.

A permanent pasture should be the aim, since it will provide feed for a longer period than an annual one. This can be obtained by sowing 5lbs. or 6lbs. of Perennial Rye Grass in the manner previously described after one of the autumn

cultivations. Perennial Rye Grass could be sown with the Wimmera Rye Grass in the first place, but it is advisable to wait a few years until the soil is in good condition. Pastures of *Phalaris tuberosa* could be developed instead of Perennial Rye Grass. The seed-bed should be very well prepared, and freed from weeds, and a mixture of 3lbs. or 4lbs. of *Phalaris tuberosa* and a bag of Superphosphate sown to the acre. During the first year only light grazing should be given, but in the second season this pasture should withstand normal treatment.

Pasture Development on the Gray Silts.

Typical areas of this country are to be found in the Meadows, Echunga, Myponga and Mid South-Eastern districts. These lands develop excellent pastures. In their natural state they frequently carry red gums, and at Kybybolite are often described as red gum flats. The cleared virgin soil is of gray silt at the surface, and possesses a clay layer, often containing shotty ironstone, at a depth of about 9 inches to a foot. The soil is cold, wet, and easily puddled in the winter. Organic matter and plant nutrients are always low in such soils. A bulk of feed is usually produced late in the year, when the soil begins to warm up.

Such areas should be given a shallow ploughing followed by good cultivation, and in the autumn sown with 4lbs. or 5lbs. Mount Barker Subterranean Clover and a bag of Superphosphate over each acre. The addition of 5 or 6lbs. of Yorkshire Fog to the mixture may be of use for a preliminary grassing, especially under waterlogged conditions.

If an ordinary Subterranean Clover pasture has been developed by topdressing for a number of years, it can be made more productive and better balanced by the introduction of either Wimmera Rye Grass, Perennial Rye Grass or *Phalaris tuberosa*. Wimmera Rye Grass or Perennial Rye Grass can be introduced by sowing 5lbs. or 6lbs. of seed per acre after a good autumn cultivation. The former being an annual, will withstand less fertile conditions than the latter, and is preferable for planting in the early years, following the reclamation of such land from natural conditions.

Phalaris tuberosa at the rate of 1 to 2lbs. of seed per acre may be planted early in the autumn after a thorough cultivation. However, during establishment *Phalaris tuberosa* is very susceptible to competition from either Perennial Rye Grass or strong growing weeds, and therefore should be sown alone in the Subterranean Clover and superphosphate mixture.

Old Subterranean Clover Land.

In these areas, such as at Mount Barker, there are many plants of the so-called natural Perennial Rye Grass, and after annual topdressings of the Subterranean Clover a gradual natural development of Rye Grass results. However, to quickly establish Perennial Rye Grass a good autumn cultivation, followed by the sowing of 8 to 10lbs. of Perennial Rye Grass, with a bag of Superphosphate per acre will establish a good pasture.

This area is essentially suited to perennial grasses, and Perennial Rye Grass is the best for these conditions. However, should a variety in pasture growth be desired, *Phalaris tuberosa* could be added in place of the rye grass.

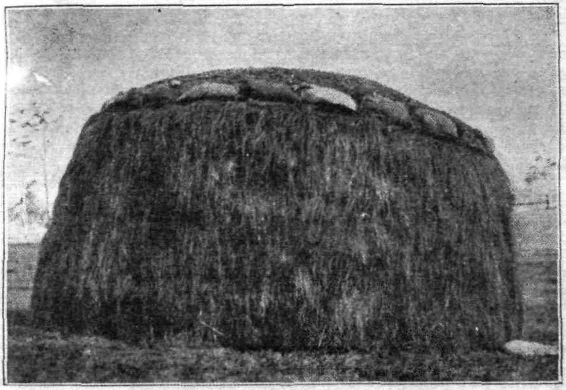
The Drained Black Lands of the South-East.

These rich black soils are high in organic matter, friable when dry, but become unworkable when wet. Since they lie in a region where the annual rainfall varies from 22.59in. at Naracoorte to 29.76in. at Millicent, the form of pasture improvement will vary according to circumstances.

It has been found that Subterranean Clover is a failure on much of this black land. On the other hand, Strawberry Clover is ideally suited to the conditions, and excellent swards of this fodder can be found growing alongside many of the roads. At Coonawarra the New Zealand Wild White Clover has not withstood the

dry summer weather as well as Strawberry Clover, with the result that this variety fails to persist. In the Millicent area, however, where the rainfall is nearly 30in., both the Strawberry and White Clovers thrive.

Perennial Rye grass is well suited to these black soils, whilst recently good results have been obtained from the planting of *Phalaris tuberosa*. In the preparation of such land for pastures the best procedure is to plough in the early summer before the annual grasses have seeded, work the soil up and sow 1in. to 1½in. deep at the time of the first autumn rains. Deep seeding is best on these friable soils because the surface dries out so quickly. The loss of late summer and autumn grazing consequent on this procedure would be compensated for by the better pasture resulting. The best pasture mixture for the drained black land is 4 to 5lbs. New Zealand Certified Perennial Rye Grass, ½lb. to 1lb. Strawberry Clover, and 1½cwts. Superphosphate. As an alternative, 2 to 3lbs. of *Phalaris tuberosa* may be used to replace the Perennial Rye Grass.



A silage stack weighed down with soil which is kept in position by bags of soil placed around the edges.

It is very important that the Strawberry Clover seed should be rubbed between large sheets of glass or emery paper before being sown. This process wears off the tough outer skin and enables water to penetrate the seed, thus ensuring a quicker and higher germination than would otherwise be the case.

In the wetter portion of the black land region, as, for example, in the vicinity of Millicent, 1 to 2lbs. New Zealand Certified Wild White Clover added to or substituted for Strawberry Clover in the mixtures given will be an advantage, whilst the general practices for the planting of the pasture as outlined previously will also apply.

Moist Dark Coloured Flats, Peaty Swamps and Marsh Localities.

Dark flats which remain moist throughout the year, and are not badly waterlogged during the winter, will produce good pasture. A suitable mixture is 6lbs. of Perennial Rye Grass and 2lbs. of White Clover, with 1½ to 2cwts. of Superphosphate to the acre. This could be conveniently sown in the early autumn or spring.

On raw peats which are springy underfoot and on poorly drained areas of good quality, a mixture of 8 to 10lbs. of Yorkshire Fog and 2lbs. of White Clover, with 1½ to 2cwts. of Superphosphate to the acre, gives the best results. Perennial Rye Grass only thrives where the plant structures of the peat have been thoroughly decomposed with the formation of a dark consolidated soil.

Where the soil is swampy or inclined to be brackish, Strawberry Clover should be established. If the surface is relatively free from waterlogging, 1 to 2lbs. of Strawberry Clover to the acre broadcasted on the surface in the early autumn (using sand or Superphosphate, preferably the latter, as the broadcasting medium) will eventually give a good stand. If the soil is saturated practically all the year, it would be better to establish the Strawberry Clover by means of cuttings set out in the autumn.

Pasture Management in the Liberal or Extended Rainfall Areas.

When sowing pastures, seed and Superphosphate should only be mixed as required, since the germinating power of seed is reduced when left in contact with Superphosphate for any length of time.

In the first year permanent pastures should be judiciously grazed to give them every chance for healthy development. It appears that most perennial pasture plants, such as *Phalaris tuberosa*, White Clover, Strawberry Clover, and to a lesser extent Perennial Rye Grass, need at least a year to become firmly established.

Annual pastures such as Wimmera Rye Grass and Subterranean Clover should always receive an autumn cultivation to prepare a suitable seedbed for the germination of the seeds. Spelling of the pasture in late spring is often necessary to ensure a good seeding of Wimmera Rye Grass.

With all pastures, an annual topdressing of 1 to 2cwts. of Superphosphate, depending on soil fertility, should be given with the first autumn rains. Many landholders prefer to apply their superphosphate in the spring, while others again apply dressings both in the autumn and spring. However, whilst two applications may be of advantage, it would appear that where only one dressing is given, autumn is the correct period for treatment, so as to encourage the growth of herbage at a time of the year when pasture development is relatively slow.

Repeated applications of sulphate of ammonia to a well-balanced grass-clover pasture depresses the clover development and lowers production. On the other hand, this fertiliser assists in establishing pasture on poor quality land which has not previously carried a good clover crop, and under such circumstances the addition of ½cwt. of sulphate of ammonia to the usual phosphatic dressing is an advantage.

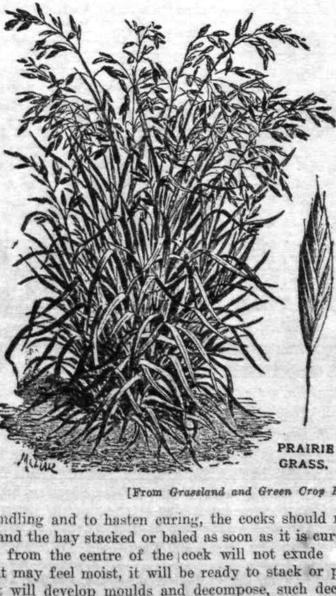
When good pastures have been established subdivision into areas of 15 to 20 acres and the practice of systematic grazing will greatly increase the stock-carrying capacity of the farm. Following this intensive system of pasture production, light harrows or some appliance designed by the landowner should be used after each grazing to break up and distribute the dung over the whole paddock. It will be found that this will be most readily accomplished after a rain when the dung is moist and easily broken. This procedure is absolutely necessary, especially when cattle are kept, in order to prevent the growth of rank unpalatable patches of pasture.

Although little experimental work has been done with pasture renovation in South Australia, it is recognised that an annual or biennial surface cultivation in the autumn with pasture harrows greatly improves production.

When the flush of growth commences in the spring the period between grazings of each paddock should be shortened, and a number of fields closed up for meadow hay or ensilage. By so utilising the flush of growth in the spring, the maximum number of stock may be carried throughout the whole of the year. The pasture is ready to cut for ensilage shortly after the clovers have passed the period of

full bloom, and the grasses are well out in head. ("The Manufacture and Utilisation of Silage" is fully described in Bulletin No. 274 of the Department of Agriculture by W. J. Spafford. This Bulletin should be in the possession of everyone interested in pastoral work.)

In making meadow hay the time of cutting depends largely on the botanical composition of the pasture. If Subterranean Clover dominates the growth, it should be cut when the base leaves of the clover commence to yellow and there are plenty of seed burrs at the surface of the ground. If grass predominates, the growth should be cut soon after it has headed. When the weather is fine at haymaking, the crop should be mowed when the dew has dried from the herbage, and immediately raked into windrows; whilst within a few hours it may be built into cocks. If the weather is particularly dry, the material should be cocked as soon as possible after cutting, whilst if the pasture has to be cut when wet, it should be left in the swath until the surface dries before being raked into windrows.



PRAIRIE GRASS.

[From *Grassland and Green Crop Farming*, Yates.]

To facilitate handling and to hasten curing, the cocks should not be more than a forkful in size, and the hay stacked or baled as soon as it is cured. If a handful of material taken from the centre of the cock will not exude sap when twisted tightly, although it may feel moist, it will be ready to stack or press. If stacked when too moist, it will develop moulds and decompose, such decomposition often resulting in spontaneous combustion. In some seasons weather conditions are not favourable for the proper curing of hay, and under these circumstances the addition of about 40lbs. of salt to the ton will check fermentation and the development of moulds, resulting in the curing of a very palatable Brown Hay, provided that the fodder is not too damp at the time of stacking. If possible meadow hay should be stored in sheds, because exposure to the weather results in deterioration.

D. PASTURE IMPROVEMENT ON THE IRRIGATED MURRAY SWAMPS.

This area of about 13,000 acres provides a special problem. An 11 to 14 inch annual rainfall mainly received in the winter is obtained. During the dry period from October to May frequent irrigations are necessary for successful plant growth. The soil is a very rich clay containing a high percentage of organic matter, and as a result yields herbage especially rich in nitrogen. Where permanent Perennial Rye Grass pastures have been established, it often happens that the green herbage is so rich and unbalanced, especially in nitrogen, that the digestive systems of cows and sheep are upset, with the result that these animals scour badly and fall away in condition. In the past, lucerne was the main fodder crop, usually being mown and fed to cows as either green stuff, hay, or ensilage. With the low prices ruling for milk products it has become necessary to eliminate as much as possible the handling of fodder, with the result that permanent pastures now predominate on the Murray Swamps.

Cocksfoot showing (a) seed head, and (b) base of leaf blade.

It has been found that the most useful pasture plants for the Murray Swamps areas are Prairie Grass, Perennial Rye Grass, Cocksfoot, *Phalaris tuberosa*, Kentucky Blue Grass, White Clover, Montgomery Red Clover, Italian Rye Grass, Perennial Red Clover or Cow Grass, and Lucerne.

The Main Characteristics of the Pasture Plants Important on the Murray Swamps.

PRAIRIE GRASS (*Bromus unioloides*).—Under Murray Swamp conditions this is one of the best grasses, giving excellent winter and summer growth, and a good bulk of early autumn feed. It acts as a biennial, and together with its free seeding habit forms a permanent pasture. Under grazing it develops a well-balanced grassy sward in association with the wild White Clover of the swamps. Such a pasture is a useful change from one containing the richer Perennial Rye Grass. Investigations by officers of the Waite Institute indicate that plots of Prairie Grass raised

from commercial seed have not been satisfactory on the swamps. When purchasing seed, therefore, it would be advisable to obtain it from swamp settlers who have productive and persistent swards of this grass. The usual price per pound is about 5d., 50,000 seeds being contained in a pound. The best time to sow is in the autumn.

PERENNIAL RYE GRASS (*Lolium perenne*).—This is a highly nutritious and productive perennial grass which is very persistent under grazing. Its only drawback is its richness under swamp conditions. Unless properly managed it may cause scouring and digestive trouble in animals. As mentioned previously, New Zealand Certified Perennial Rye Grass costing about 8d. a pound is the best strain, and autumn the most suitable time for planting.

COCKSFOOT (*Dactylis glomerata*).—This perennial grass is very useful for inclusion in autumn-sown pasture mixtures containing Perennial Rye Grass. Its main period of growth is during the spring, summer, and autumn. On the Murray Swamps, Cocksfoot does not reach full development until about the third year. A pound of seed costing 1s. 4d. to 1s. 7½d. contains 500,000 seeds. New Zealand Akaroa Cocksfoot is the best strain to purchase.

A

B

A—Giant Colonial Cow Grass, and B—Red or Broad Clover.
[From *G. and N. Catalogue*, 1934.]

WHITE CLOVER (*Trifolium repens*).—The swamp conditions are well suited to the growth of this clover; in fact, many blocks tend to become overrun with a wild strain. As mentioned previously, Certified New Zealand Wild White Clover costing 3s. 6d. a pound is the best strain to sow in a pasture mixture.

MONTGOMERY RED CLOVER (*Trifolium pratense*).—This is a prostrate strain with a longer life than ordinary Red Clover, and promises to have a definite place in pasture mixtures on the Swamps. A pound of New Zealand Certified Montgomery Red Clover containing 218,000 seeds costs 3s. 6d.

GIANT COLONIAL COW GRASS OR PERENNIAL RED CLOVER (*Trifolium pratense perenne*).—This is a more vigorous and longer-lived strain than the ordinary Red Clover. Together with Italian Rye Grass it makes the best temporary pasture for the Swamps. It is mainly a spring and summer grower, and needs well-drained conditions in which to thrive. It is more adapted to cutting than grazing. A pound of seed containing 218,000 grains is 1s. 6d. It can be sown in the autumn or late winter.

PHALARIS TUBEROSA.—The main characteristics of this grass have been mentioned previously. It will not establish and grow well in conjunction with Perennial Rye Grass on the Swamps. When sown alone with White Clover there is a tendency for weeds to develop between the *Phalaris tuberosa* plants. Kentucky Blue Grass (*Poa pratensis*) grows well with *Phalaris tuberosa*, and forms a sward which prevents the ingress of weeds. On the fertile swamps, *Phalaris tuberosa* unless kept closely grazed, quickly becomes rank and unpalatable. It should always be autumn sown.

KENTUCKY BLUE GRASS (*Poa pratensis*).—This fine-leaved grass, possessing *creeping stems, grows mainly during the autumn, winter, and early spring.* As mentioned above, it appears to have a definite place in a *Phalaris tuberosa* pasture. The seed commands about 2s. a pound, each pound containing 1,860,000 seeds.

ITALIAN RYE GRASS (*Lolium multiflorum*).—Together with Red Clover, this forms a very satisfactory temporary pasture. It is a biennial under these conditions, and produces heavy summer yields. It is better adapted to cutting than grazing. A pound of seed is about 4d. and contains 270,000 seeds.

LUCERNE (Medicago sativa).—The main characteristics of this plant have been mentioned earlier. Under mowing conditions on the swamps, Lucerne stands will last for about 10 years, but a few years of grazing will soon thin out the stand.

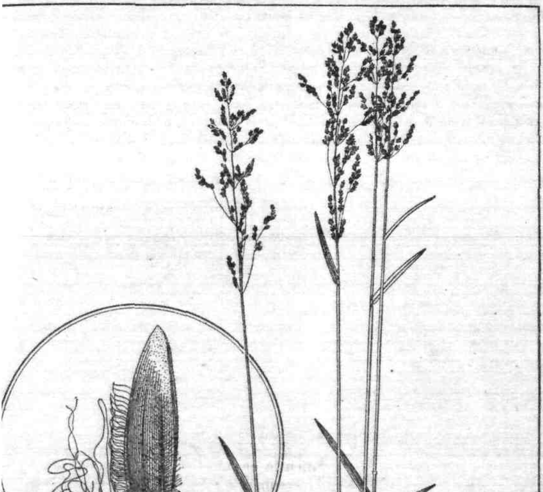
Pasture Establishment on the Irrigated Murray Swamps.

All pasture seeds should be sown on a well-prepared seed-bed at a time when the young seedlings will not be scorched by the hot sun. Autumn and early spring, preferably the former, are the main seeding periods. On the Murray Swamps the natural rainfall is so uncertain that it is wise to irrigate the land beforehand to ensure a good germination. As soon as the land can be worked after the irrigation, a good seed-bed should be prepared, and the seed and superphosphate sown. If the land is very weedy, an irrigation to germinate the rubbish should be given, and these weeds destroyed before proceeding with the seeding operations. The question of a further irrigation after planting will depend entirely upon the character of the season, but if the weather should prove hot and dry, resulting in danger of a poor germination, the land should again be watered.

As a result of investigations conducted by the Waite Agricultural Research Institute, Mr. H. C. Trumble, M.Agr.Sc., in his article, "The Establishment and Management of Irrigated Pastures" (*Journal of Agriculture,* S.A., March, 1934), recommends the following mixtures for establishing permanent pastures on the Murray Swamps:—10lbs. Certified Perennial Rye Grass, 8lbs. Akaroa Cocksfoot, 2lbs. Certified Wild White Clover (and when available 2lbs. Montgomery Red Clover), 1½ to 2cwts. Superphosphate; or 4lbs. *Phalaris tuberosa*, 4lbs. Kentucky Blue Grass, 2lbs. Certified White Clover (and when available 2lbs. Montgomery Red Clover), 1½ to 2cwts. Superphosphate. The second pasture mixture is quite safe as regards scouring, but the first may cause trouble unless carefully managed. A pasture seeded down with 12lbs. of Prairie Grass, 2lbs. of Certified Wild White Clover, and 1½ to 2cwts. Superphosphate will make a useful change from richer pastures.

The best temporary pasture for seeding under these conditions consists of 8 to 10lbs. of Italian Rye Grass and 5lbs. of Red Clover (Cow Grass), together with a bag of Superphosphate per acre.

one When planting Lucerne, 20lbs. of seed and 2cwts. of Superphosphate should be
bulk a to the acre on a well-prepared seed-bed. Autumn is the best time for seeding.
habit form planted at this period of the year a highly productive stand is secured
sward in a summer.
is a useful ch
tions by officers



Kentucky Blue Grass.

[From *Grasses and Fodder Plants of N.S.W.*, by E. Breakwell.]

Pasture Management on the Irrigated Murray Swamps.

For the successful utilisation of pasture growth under these fertile conditions subdivision and rotational grazing is essential. By this means pasture growth is not wasted, and the stock-carrying capacity is greatly increased. The grazing areas should be subdivided, so that according to the number of stock carried each can be grazed about every four weeks. The pasture growth in these paddocks should be regularly fed off by placing a large number of stock into each of them successively for about a week at a time. Thus every field is grazed down at intervals of from five to six weeks. After grazing, each paddock needs some kind of harrowing to distribute the droppings, as if the dung is allowed to accumulate in patches, rank unpalatable growth will result.

During the cold winter period pasture growth will be at a minimum, with the result that unless hay or ensilage is available, the stock-carrying capacity of the area will also be at a corresponding level. In the flush of spring feed is usually abundant, and the normal number of stock are often unable to cope with the fodder produced. Consequently a number of fields would be reserved for harvesting as hay or ensilage, and the animals turned into the remaining paddocks at more frequent intervals. At about flowering time the pasture growth in the closed areas can be cut for hay or ensilage. The material so conserved is available for hand-feeding during the lean periods of the year, and the stock-carrying capacity maintained at its maximum.

In addition, annual applications of about 2cwts. of Superphosphate and frequent summer irrigations are necessary. At present many of the settlers find that they can only use the irrigation water at wide intervals. This is a serious disadvantage, and if full pasture production is to be obtained, ability to water every two to three weeks, especially during the hot months of the year, is essential.

SUMMARY.

1. A knowledge of the principles of pasture improvement is essential for maximum returns from agricultural areas in South Australia.

2. The South Australian climate is not particularly favourable to pasture development inasmuch that a period of liberal winter rainfall is followed by summer drought accompanied by high temperatures and great evaporation.

3. There are three distinct pasture areas in this State namely: 1. The Cereal Cultivation Belt. 2. The areas receiving more than 20 inches annual rainfall. 3. The Irrigated Murray Swamps.

4. The most useful pasture plants in the cereal cultivation country are Wimmera Rye Grass, Lucerne, Burr and Barrel Medics, Evening Primrose, ***Phalaris tuberosa,*** and Dwalganup Subterranean Clover.

5. The main divisions of the Cereal cultivation country are: 1. Areas receiving less than 17-18 inches average annual rainfall. 2. Areas receiving more than 18 inches average annual rainfall. 3. Areas with ground water close to the surface.

6. For the lower rainfall cereal-growing areas the most valuable varieties are: Evening Primrose, Wimmera Rye Grass, and Lucerne.

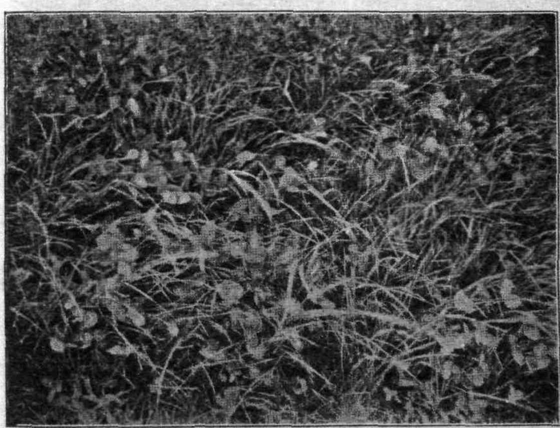
7. For the higher rainfall cereal-growing areas the most valuable varieties are Evening Primrose (for poor sandy soils), Lucerne, Dwalganup Subterranean Clover and *Phalaris tuberosa.*

8. Lucerne is the most important pasture plant in areas where ground water is relatively close to the surface.

9. The pasture plants most suitable to the areas receiving liberal or extended annual rainfall are Wimmera Rye Grass, Perennial Rye Grass, *Phalaris tuberosa*, Subterranean Clover, White Clover, and Strawberry Clover.

10. The main divisions of the higher rainfall areas are:—

1. Sandy and poor gravelly soils.
2. Red shotty ironstone soils.
3. Gray sticky loams.
4. Grey silty soils.
5. Old Subterranean clover lands.
6. Drained black land.
7. Moist dark flats or swamps.



A well balanced Perennial Rye Grass, Cocksfoot, and White Clover Pasture at Wood's Point.

[From C.S.I.R., Bull. 71, by A. E. V. Richardson, M.A., D.Sc., and H. P. C. Gallus, B.Sc.]

11. On poor sandy soils the cost of clearing is an important consideration. The area should be planted with Subterranean Clover and adequately manured with Superphosphate. When the fertility has been improved Wimmera Rye Grass may be introduced and in the course of time Perennial Rye Grass can be planted.

12. *Subterranean Clover and Wimmera Rye Grass sown in conjunction with* Superphosphate are the best pasture plants for shotty ironstone land.

13. Gray sticky loams are best suited to Subterranean Clover, Wimmera Rye Grass, Perennial Rye Grass, and *Phalaris tuberosa.*

14. When fully manured grey silts develop excellent pastures. After Subterranean Clover has been established and topdressed for a number of years, Wimmera Rye Grass, Perennial Rye Grass, or *Phalaris tuberosa* may be introduced.

15. Old Subterranean Clover land may be improved by the planting of Perennial Rye Grass or *Phalaris tuberosa.*

16. Subterranean Clover does not do well on much of the drained black land of the South-East. Strawberry Clover is ideally suited to these conditions, whilst White Clover thrives in the higher rainfall areas. Perennial Rye Grass is the best grass, whilst *Phalaris tuberosa* has given excellent results where it has been tried.

17. Dark moist flats yield the maximum amount of fodder when planted with Perennial Rye Grass and White Clover, but on raw peaty soils which are springy underfoot Yorkshire Fog should be substituted for the Rye Grass. On the other hand, for swampy soil, which is inclined to be brackish, Strawberry Clover is preferable to White Clover.

18. Good pasture management is required for best results. Most perennial pasture plants should only be lightly grazed in the first year. Annual plants such as Wimmera Rye Grass and Subterranean Clover respond to autumn cultivation, whilst all pastures should be tilled to assist growth and break up animal droppings. Adequate phosphatic manuring is necessary, whilst subdivision of fields and systematic grazing, together with the conservation of fodder allows for carrying the maximum number of stock. The manufacture of ensilage and meadow hay should be a regular practice.

19. Pasture improvement on the Irrigated Swamp lands is a special problem. The most useful pasture varieties for these areas are Prairie Grass, Perennial Rye Grass, Cocksfoot, *Phalaris tuberosa,* Kentucky Blue, Italian Rye Grass, White Clover, Montgomery Red Clover, Red Clover, and Lucerne.

20. A mixture of Perennial Rye Grass, Cocksfoot, White Clover, and Montgomery Red Clover; or *Phalaris tuberosa,* Kentucky Blue, White, and Montgomery Red Clover is recommended; whilst another useful mixture for a permanent pasture for the swamps contains Prairie Grass and White Clover.

21. The best temporary pasture for these conditions consists of Italian Rye Grass and Red Clover.

22. For mowing and high production during the summer months the planting of lucerne is recommended.

23. For successful utilisation of the pasture growth subdivision and regular grazing coupled with the manufacture of ensilage and meadow hay are essential. Annual manuring, the use of pasture harrows and ability to irrigate at frequent intervals are also factors affecting pasture production on the reclaimed areas of the Lower Murray.

WORMS IN SHEEP.

BLACK LEAF 40.

Replying to a correspondent at Tintinara, who asked for the correct dose of Black Leaf 40 and bluestone solution for internal parasites of sheep, Mr. R. H. F. Macindoe, B.V.Sc., M.R.C.V.S., says the solution recommended is as follows:—Bluestone (copper sulphate), 1lb.; water, 6galls.; Black Leaf 40, 13½ fluid ounces. *To make*—Dissolve the bluestone crystals in hot water and add the balance of water to make 6galls. of solution. Then stir in the Black Leaf 40. *Doseage Table*: Adult sheep, 2 fluid ounces; 2-tooth sheep, 1½ fluid ounces; lambs, 6-12 months, 1 fluid ounce; lambs, 3-6 months, ½ fluid ounce. Sheep are drenched without any preliminary fasting and can be turned out to graze immediately after. It will be noticed that after drenching, the sheep may stagger for an hour or two, but they soon recover. No mortality or other ill-effects have been noted or reported following the use of this drench, but it is essential that the doseage recommended be carefully followed.

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RAISING EXPORT LAMBS ON SUBTERRANEAN CLOVER PASTURE LANDS.

[By L. J. COOK, R.D.A., Manager Kybybolite Experimental Farm.]

During 1933 and 1934 a small experiment on the raising of Export Fat Lambs has been conducted at the Kybybolite Experimental Farm. The idea was primarily to compare the development of various crosses, when grazed on improved Subterranean Clover pastures, but the scope of the work has been restricted by the funds and labour available. No attempt could be made to test the various breeds or cross-breeds of ewes, as mothers, but a trial of five of the more important British breeds of rams, used on Comeback ewes is being carried out.

The Farm has for some seasons been breeding a good quality line of Comeback ewes, the result of mating Merino rams back to half-bred English Leicester x Merino ewes, and a selected line of these is being used as mothers for the lambs. Four flocks in 1933 and five in 1934 were carefully selected, even in type, development, age, and live weight.

In 1933 each flock consisted of 17 four-tooth and 29 six and eight tooth ewes, and the average live weight at mating time was 116lbs.

In 1934 each flock consisted of 13 six-tooth and 31 eight-tooth ewes, and the average live weight at mating was 115lbs.

The four sires used in 1933 were Suffolk, Dorset Horn, Southdown, and English Leicester, and in 1934 a Ryeland was added for the fifth flock.

Whilst being mated the flocks were grazed in fields of approximately equal area, and containing similar pasturage, but after mating, all the ewes were run together as one flock, and grazed under a rotational system on good fertilized clover pastures. A week or so before lambing commenced the flock was again divided into its sections, and each run on similar type of clover pasture during the lambing period. After marking, lambs and ewes were again run together as one flock. During the whole period neither ewes nor lambs were handfed, and they existed and grew entirely on grazing.

With the exception of the second consignment in 1933, all lambs were sold off their mothers, and were grazed only on Subterranean Clover with its mixture of naturalised grasses, such as Barley and Brome Grasses. On account of unfortunate attacks by stray dogs, the late lambs in 1933 received a setback, and had to be weaned, and were topped on a pea stubble before being sold on 1st February, 1934.

The flocks were examined twice daily during lambing, and note of births taken.

In 1933 three ewes were given assistance, one each in lamb to the Suffolk, Southdown, and Dorset Horn. Two ewes died at lambing, one in lamb to Suffolk and one in lamb to English Leicester.

In 1934 three ewes were given assistance, two in lamb to Suffolk and one in lamb to Ryeland, and no ewes were lost at lambing.

The following table shows the number of lambs born, died, marked, and marketed from each of the flocks each season.

Ewes were mated to rams on 18th February, 1933, and 5th February, 1934, and lambs commenced to arrive on 15th July, 1933, and 1st July, 1934

TABLE I.—*Lambing Results.*

Season.	Ewes Mated.	Ewes Failed to Breed.	Ewes Died.	Total Lambs Born.		Lambs Born Dead.	Lambs Died between Birth and Marking.	Lambs Marked.			Lambs Died between Marking and Marketing.	Lambs Marketed.	
		No.	No.	No.	%	No.	No.	No.	%		No.	No.	%
1933	46 Comeback x Southdown	1	0	61		6	5	50	111·1		3	47	
1934	44 Comeback x Southdown	20	0	34	137·7	0	5	29	120·8	114·5	0	29	110·0
1933	46 Comeback x Dorset Horn	2	0	65		8	7	50	113·6		5	45	
1934	44 Comeback x Dorset Horn	5	0	52	141·0	1	2	49	125·6	119·3	3	46	109·6
1933	46 Comeback x Suffolk	3	1	55		2	2	51	118·6		7	44	
1934	44 Comeback x Suffolk	4	0	59	137·3	3	7	49	122·5	120·5	4	45	107·2
1933	46 Comeback x English Leicester	2	1	64		3	7	54	122·7		3	51	
1934	44 Comeback x English Leicester	5	1	51	138·5	1	11	39	100·0	112·0	1	38	107·2
1934	44 Comeback x Ryeland	11	0	47	142·4	2	4	41	124·2		2	39	118·2
Totals—													
1933	184 Comeback ewes	8	2	245		19	21	205	116·5		18	187	106·2
1934	220 Comeback ewes	45	1	243		7	29	207	118·3		10	197	112·6
Both years	404 C[illegible]eback ewes	53	3	488		26	50	412	117·4		28	384	109·4

Percentages quoted in above table show per cent. of lambs to the number of ewes that bred.

It will be noticed that in the first column of Table I. quite a large number of ewes mated to the Southdown and Ryeland rams in 1934 failed to breed. This is attributed solely to the partial failure of the individual rams used, and allowance must necessarily be made in cases such as these. We were forced to restrict the flocks in size, and could only use one ram in each, which is not altogether a practical procedure in sheep breeding. Hence, in perusing the table, due allowance must be made for the dry ewes.

Column 3 shows that in 1933 the Dorset Horn and English Leicester crosses were approximately equal in prolificacy with 65 and 64 lambs born respectively, closely followed by the Southdown cross with 61 births. In 1934 the Suffolk cross produced the most lambs with 59 births. For the two seasons the percentage of births to ewes in lamb show the Ryeland cross (one season only) greatest with 142.4 per cent.; the Dorset Horn cross second with 141 per cent.; the English Leicester cross third with 138.5 per cent,; and the Southdown and Suffolk crosses produced 137 per cent., so that from this aspect there was very little difference in prolificacy shown by the different crosses.

Column 4 shows the number of lambs born dead, the Dorset Horn cross with 9 having the greatest number, although again no significant difference amongst the breeds is noted.

Column 5 shows the number of lambs that died between birth and marking and consisted mostly of lambs that died during the first few days after lambing. The English Leicester cross with 18 shows double the loss of the other crosses.

Column 6 gives the actual number of lambs marked each year, and the percentage marked to ewes that bred for the two seasons. In 1934 the Dorset Horn cross had the highest percentage with 125.6 per cent., closely followed by the Ryeland cross with 124.2 per cent. For the two seasons combined, the Suffolk cross marked the most with 120.5 per cent., with the Dorset Horn cross close up with 119.3 per cent. This result shows the strength of the Suffolk cross lambs, for whereas this cross had the least number of births, they had less losses until marking, enabling them to mark the highest percentage. These lambs were noticed to be very strong and vigorous. The weakest lambs were amongst the English Leicester cross, which reduced their percentage marked to 112 per cent.

The next column shows the number of lambs that died between marking and marketing, and two facts are to be noted. Firstly, that considerably less lambs were lost during this stage in 1934 than in 1933; and secondly, that the bulk of deaths occurred amongst the stronger and more vigorous lambs. These deaths can largely be attributed to attacks by the *Bacillus ovitoxicus*, causing the braxy-like disease entero-toxaemia. The strong lambs of the Suffolk and Dorset Horn crosses suffered most during this period.

The final column gives the actual number of lambs marketed, and the percentages to ewes that bred. Here, again, with the exception of the Ryeland cross, which has had only the one year of test, there is not much difference between the crosses, less than 3 per cent. between the English Leicester and Suffolk crosses with 107.2 per cent., and the Southdown cross with 110 per cent.

For the two seasons 384 lambs (109.4 per cent.) were marketed from 351 ewes that bred.

All lambs reared were marketed, and in two consignments each season. In 1933 the tops were consigned to freezers on 7th November (13 to 14 weeks of age), and the balance on 1st February, 1934. The 1934 tops were consigned on 30th October (14 to 15 weeks of age), and the balance on 18th December (21 to 22 weeks of age).

WEIGHT OF LAMBS.

The lambs were weighed individually on the Farm before consignment, and the cold dressed weights have been provided by the Portland Freezing Works.

Table II. shows the average live and dressed weights of each cross in the four consignments, with the percentages of dressed to live weight.

It is significant that in every consignment the Comeback x Southdown lambs averaged the greatest percentage of dressed weight. They were 2 per cent. and 3 per cent. better than the other crosses. This is typical of the breed and verifies similar results obtained by experimentalists in previous work in other districts, where Southdown blood has been used. By averaging the four consignments it is shown that the Southdown cross lambs dressed 43.1 per cent. of their live weight, the Dorset Horn cross 41.9, the Suffolk cross 41.3 per cent., the Ryeland cross 40.3 per cent., and the English Leicester 40.2 per cent. The general average of 41.4 per cent. dressed to live weight of all lambs is perhaps low, but allowance must be made for 150 miles transit from Farm to Freezing works. The lambs were all sold in the wool.

TABLE II.—*Weight of Lambs.*

Season.		Breed.	Live Weight at the Farm.		Dressed Weight at Portland.			
			Lbs.		Lbs.		Per cent.	
1933....	28	Comeback x Southdown	72·8		31·7		43·5	
	17	Comeback x Southdown	75·3		32·2		42·7	
1934....	8	Comeback x Southdown	66·6	71·9	31·5	31	47·3	43·1
	19	Comeback x Southdown	69·8		28·5		40·8	
1933....	29	Comeback x Dorset Horn	75·3		30·7		40·9	
	13	Comeback x Dorset Horn	90·2		37·1		41·1	
1934....	33	Comeback x Dorset Horn	73·1	76·6	32·8	32·1	44·8	41·9
	11	Comeback x Dorset Horn	74·5		27·4		36·8	
1933....	33	Comeback x Suffolk	75·1		30·7		40·9	
	9	Comeback x Suffolk	81·9		33·2		40·6	
1934....	26	Comeback x Suffolk	73·0	75·6	33·1	31·2	45·3	41·3
	17	Comeback x Suffolk	77·4		28·0		36·2	
1933....	26	Comeback x English Leicester	70·5		28·5		40·4	
	22	Comeback x English Leceister	83·5		32·9		39·5	
1934....	16	Comeback x English Leicester	68·4	75·7	30·9	30·4	45·1	40·2
	21	Comeback x English Leicester	79·7		29·8		37·4	
1934....	18	Comeback x Ryeland	70·5	72·5	31·9	29·2	45·2	40·3
	19	Comeback x Ryeland	74·3		26·6		35·8	
Average all crosses—								
1933....	116	First consignment	73·5		30·5		41·4	
	61	Second consignment	82·4		33·7		40·9	
1934....	101	First consignment	71·3	74·8	32·3	31·0	45·3	41·4
	87	Second consignment	75·2		28·2		37·5	

The whole 365 lambs averaged approximately 75lbs. live weight when removed from their mothers and dressed 31lbs. on the hooks, an ideal weight for export purposes. The Dorset Horn cross were the heaviest lambs, 76½lbs. on the average, and dressed 32.1lbs. The Suffolk and English Leicester crosses were 1lb. lighter in live weight and dressed 31.2 and 30.4lbs. respectively. The Southdown cross were the lightest lambs, 72lbs. live weight, but dressed the best with 31lbs. average.

QUALITY OF LAMBS.

Regarding the quality of the lambs for export, the following table shows the number and percentages of carcasses of each cross in each consignment, placed in grades by the purchasers (Messrs. Borthwicks Limited).

TABLE III.—*Quality of Lambs.*

Season.		Breed.	First Quality.	Second Quality.	Third Quality.	Rejects.
			No.	No.	No.	No.
1933 ..	28	Comeback x Southdown .	28	—	—	—
	17	Comeback x Southdown .	14	2	—	1
1934 ..	8	Comeback x Southdown .	8	—	—	—
	19	Comeback x Southdown .	14	5	—	—
	72		64 88·9%	7 9·7%	—	1 1·4%
1933 ..	29	Comeback x Dorset Horn	18	11	—	—
	13	Comeback x Dorset Horn	10	3	—	—
1934 ..	33	Comeback x Dorset Horn	29	4	—	—
	11	Comeback x Dorset Horn	4	5	2	—
	86		61 70·9%	23 26·8%	2 2·3%	—
1933 ..	33	Comeback x Suffolk	18	13	2	—
	9	Comeback x Suffolk	3	4	1	1
1934 ..	26	Comeback x Suffolk	20	6	—	—
	17	Comeback x Suffolk	5	9	3	—
	85		46 54·1%	32 37·6%	6 7·1%	1 1·2%
1933 ..	26	Comeback x English Leicester	12	10	2	2
	22	Comeback x English Leicester	18	4	—	—
1934 ..	16	Comeback x English Leicester	11	4	1	—
	21	Comeback x English Leicester	9	12	—	—
	85		50 58·8%	30 35·3%	3 3·5%	2 2·4%
1934 ..	18	Comeback x Ryeland ...	16	2	—	—
	19	Comeback x Ryeland ...	6	8	5	—
	37		22 59·5%	10 27·0%	5 13·5%	—
		Total all crosses, 365 lambs	243 66·6%	102 27·9%	16 4·4%	4 1·1%

This table shows that of the 365 lambs, 243 were classed as first quality, 102 as second quality, 16 as third quality, and 4 were rejected. This result is quite satisfactory when it is remembered that every lamb reared in the flocks was sent to the freezers—none were held back on the Farm.

The outstanding fact is the excellent quality of lambs produced by the Southdown cross. In the first consignment of each season this cross was 100 per cent. first quality, and the results of the second consignments show that they maintain their primeness very well. In all 64 lambs out of 72 (89 per cent.) of this cross were first quality, whereas the average of all crosses was only 66.6 per cent. first quality. These Southdown cross lambs produced very fine shapely carcasses of prime quality and comparatively even in weight. In live weight this season there was a variation of 26lbs. between the lightest and heaviest lambs, but 55 per cent. of the lambs weighed within 3lbs. of the average for all of the cross.

The Comeback x Dorset Horn lambs ranked second in quality with 71 per cent. first quality, 27 per cent. second, and only 2 per cent. third quality. They were fine prime lot, growing and maturing quickly, but lacking in conformation. Also

there was a greater variation in the live weights, only 36 per cent. of the lambs this season weighing within 3lbs. of the average for the cross and there was a difference of 37lbs. between the lightest and heaviest lambs.

The Comeback x Ryeland lambs produced 59½ per cent. first quality, 27 per cent. second quality, and 13½ per cent. third quality. The tops of this cross were very fine prime lambs, almost equal to the Comeback x Southdown. Unfortunately there was a fairly large number of late lambs in this group and they caused the high percentage of third grade lambs, which we were forced to market in an immature state. The weights of these lambs varied much the same as the Comeback x Dorset Horn, there being 32lbs. difference between the lightest and heaviest lambs and only 35 per cent. of the lambs weighed within 3lbs. of the average for the cross.

For shape and conformation the Comeback x English Leicester lambs were good and were not greatly inferior to the Southdown cross. They were, however, slower in maturing, and did not thrive quite so well as the other crosses. Fifty-nine per cent. of their carcasses were classed as first quality, and in evenness of weight and development they ranked next to the Southdown cross, 46 per cent. of their lambs weighing within 3lbs. of the average for the cross.

The Suffolk cross lambs show to least advantage as regards quality. They were very strong, quick-growing lambs, but did not maintain their primeness well. The carcasses lacked in conformation more than the Dorset Horn cross. They also showed the greatest variation in development, as only 30 per cent. of the lambs weighed within 3lbs. of their average live weight.

VALUE OF THE LAMBS.

The lambs this season were all sold on the hooks at Portland, and Table IV. gives the details of returns for the various crosses:—

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TABLE IV.—*Lamb Values and Returns*, 1934.

No. and Breed.	Lamb. lbs. Price.	Value.	Value per Carcass.		Skin Value.	Charges.	Net Val[ue] of Lam[b]	
	d.	£ s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s
Comeback x Southdown—								
1st Consignment—								
8 carcasses	252 at 6⅛	6 8 7	16 1		2 0	2 1	16 0	
2nd Consignment—								1
14 carcasses	401 at 6⅛	10 4 8	14 7½	14 0				
5 carcasses	141 at 5¼	3 1 8	12 4		2 4	2 0	14 4	
Comeback x Dorset Horn								
1st Consignment—								
22 carcasses	699 at 6⅛	17 16 9	16 2½					
6 carcasses	231 at 5$\frac{13}{16}$	5 11 11	18 8	16 3	2 2	2 1	16 4	
1 carcass	43 at 5⅝	1 0 2	20 2					
4 carcasses	108 at 5¼	2 7 3	11 10					
2nd Consignment—								1
4 carcasses	126 at 6⅛	3 4 4	16 1					
5 carcasses	129 at 5¼	2 16 5	11 3	12 8½	2 2	2 0	12 10½	
2 carcasses	46 at 5	0 19 2	9 7					
Comeback x Suffolk—								
1st Consignment—								
13 carcasses	429 at 6⅛	10 19 0	16 10					
7 carcasses	266 at 5$\frac{13}{16}$	6 8 10	18 5	16 2	2 3	2 1	16 4	
6 carcasses	165 at 5¼	3 12 2	12 0					
2nd Consignment—								14
5 carcasses	150 at 6⅛	3 16 7	15 4					
9 carcasses	251 at 5¼	5 9 10	12 2½	12 9½	2 0	2 0	12 9½	
3 carcasses	75 at 5	1 11 3	10 5					
Comeback x English Leicester—								
1st Consignment—								
10 carcasses	316 at 6⅛	8 1 4	16 1½					
1 carcass	38 at 5$\frac{13}{16}$	0 18 5	18 5	15 0½	2 3	2 1	15 2½	
4 carcasses	114 at 5¼	2 9 10	12 5½					
1 carcass	26 at 5	0 10 10	10 10					14
2nd Consignment—								
9 carcasses	288 at 6⅛	7 7 0	16 4	14 0½	2 4	2 0	14 4½	
12 carcasses	338 at 5¼	7 7 11	12 4					
Comeback x Ryeland—								
1st Consignment—								
15 carcasses	480 at 6⅛	12 5 0	16 4					
1 carcass	37 at 5$\frac{13}{16}$	0 17 11	17 11	16 0	2 4	2 1	16 3	
2 carcasses	57 at 5¼	1 4 11	12 5½					
2nd Consignment—								14
6 carcasses	185 at 6⅛	4 14 5	15 9					
8 carcasses	219 at 5¼	4 15 10	12 0	12 3	2 1	2 0	12 4	
5 carcasses	102 at 5	2 2 6	8 6					
Total all crosses—								
1st Consignment—								
68 carcasses	2,176 at 6⅛	55 10 8	16 4					
15 carcasses	572 at 5$\frac{13}{16}$	13 17 1	18 5½					
1 carcass	43 at 5⅝	1 0 2	20 2	15 11½	2 2½	2 1	16 1	
16 carcasses	444 at 5¼	9 14 2	12 1½					
1 carcass	26 at 5	0 10 10	10 10					
2nd Consignment—								14
38 carcasses	1,150 at 6⅛	29 7 0	15 5½					
39 carcasses	1,078 at 5¼	23 11 8	12 1	13 3	2 2	2 0	13 5	
10 carcasses	223 at 5	4 12 11	9 3½					

The prices in the final column show the net price per head for each cross received at Kybybolite, after paying freight and charges, and shows that the Comeback x Dorset Horn lambs returned the best price, namely, 15s. 5½d. per head—6½d. better than the Suffolk cross, which realised 14s. 11d. each, and 7½d. better than the Southdown cross, which realised 14s. 10d. each.

The English Leicester cross averaged 14s. 8½d. and the Ryeland cross 14s. 3d. each. On perusing the returns of the first consignment it will be noticed that only 1d. per lamb separated the Dorset Horn, Suffolk, and Ryeland crosses, whilst the Southdown cross with 16s. per lamb was only 3d. less. In the second consignment the Southdown and English Leicester crosses realised 14s. 4d. each—1s. 6d. and 2s. per head better than the others.

The skin value of the different crosses did not vary much, the English Leicester cross being worth 1d. per skin more than the Ryeland cross, the latter ½d. per skin more than the Southdown and Dorset Horn crosses, and 1d. more than the Suffolk cross.

The charges on conveyance and selling of lambs at Portland are approximately 2s. per head, including 7d. railage Kybybolite to Mount Gambier and 6d. railage Mount Gambier to Portland.

In the next table the prices received in 1933 have been included with those of 1934, and the average price of each quality lamb has been computed for the two seasons. Details of the sale of 1933 lambs were published in Vol. 37, pages 1238-1240, *South Australian Journal of Agriculture.*

TABLE V.—*Value of Lambs at Kybybolite*, 1933-34.

No.	Quality.	Breed.	Price per lamb. s. d.	s. d.
64	First ...	Comeback x Southdown	15 10	
7	Second .	Comeback x Southdown	13 2	15 5½
1	Reject .	Comeback x Southdown	7 9	
61	First ...	Comeback x Dorset Horn	16 10	
23	Second .	Comeback x Dorset Horn	12 8½	15 7
2	Third ..	Comeback x Dorset Horn	9 9	
46	First ...	Comeback x Suffolk	16 4¾	
32	Second .	Comeback x Suffolk	12 11¾	
6	Third ..	Comeback x Suffolk	10 5½	14 7
1	Reject .	Comeback x Suffolk	8 11¾	
50	First ...	Comeback x English Leicester	16 10	
30	Second .	Comeback x English Leicester	12 4	
3	Third ..	Comeback x English Leicester	9 10¼	14 8¾
2	Rejects .	Comeback x English Leicester	5 5¼	
22	First ...	Comeback x Ryeland	16 5½	
10	Second .	Comeback x Ryeland	12 2½	14 3
5	Third ..	Comeback x Ryeland	8 7	
Average value of all lambs, 1933			15 1½	
Average value of all lambs, 1934			14 10½	
Mean average value of all lambs 1933-34			15 0	

These figures show that the whole of the lambs sent to the freezers realised 15s. 1½d. per head at Kybybolite in 1933 and 14s. 10½d. in 1934, or a mean average of 15s. per head for the two seasons. The Dorset Horn cross was the most valuable at 15s. 7d. each, whilst the Southdown cross averaged 15s. 5½d.—only 1½d. each less. The English Leicester cross averaged 14s. 3¾d.—*i.e.*, 10¼d. each less than the Dorset Horn cross, and the Suffolk cross realised 14s. 7d.—1s. less each.

RETURN OF LAMB VALUE PER EWE THAT BRED.

The next table compares the return per ewe from each flock, and to obviate the effect of single ram mating, the dry ewes have not been counted.

TABLE VI.

	Value per Ewe. s. d.
69 Comeback ewes mated to Southdown ram produced 76 marketed lambs	17 0¼
83 Comeback ewes mated to Dorset Horn ram produced 91 marketed lambs	17 1
83 Comeback ewes mated to Suffolk ram produced 89 marketed lambs	15 7¾
82 Comeback ewes mated to English Leicester ram produced 89 marketed lambs	15 11¾
33 Comeback ewes mated to Ryeland ram produced 39 marketed lambs	16 10

This table shows that ewes mated to Dorset Horn ram have returned 17s. 1d. each—only ¾d. more than the ewes mated to the Southdown ram. Those mated to the Ryeland ram returned 16s. 10d., or 3d. less, whilst those mated to English *Leicester and Suffolk rams returned considerably less, namely, 1s. 1¼d. and 1s. 5¼d.* per ewe respectively.

These figures, however, do not take into account the question of early or late maturity of lambs, and as this varied with the different breeds, an allowance for grazing can be deducted, which would then give a better comparative value.

RETURN PER EWE LESS LAMB GRAZING COST.

Table VII. shows deductions from the returns from each cross, allowing grazing of lambs at 2d. per week per head.

TABLE VII.

Comeback x Southdown returned 17s. 0¼d. per ewe	
less 30 lambs for 12 weeks at 2s. each	
" 17 lambs for 24 weeks at 4s. each	
" 10 lambs for 13 weeks at 2s. 2d. each	} 2s. 9½d. equals 14s. 2¾d. per ewe.
" 19 lambs for 20 weeks at 3s. 4d. each	
Comeback x Dorset Horn returned 17s. 1d. per ewe	
less 32 lambs for 12 weeks at 2s. each	
" 13 lambs for 24 weeks at 4s. each	
" 35 lambs for 13 weeks at 2s. 2d. each	} 2s. 6d. equals 14s. 7d. per ewe.
" 11 lambs for 20 weeks at 3s. 4d. each	
Comeback x Suffolk returned 15s. 7¾d. per ewe	
less 35 lambs for 12 weeks at 2s. each	
" 9 lambs for 24 weeks at 4s. each	
" 28 lambs for 13 weeks at 2s. 2d. each	} 2s. 6d. equals 13s. 1¾d. per ewe.
" 17 lambs for 20 weeks at 3s. 4d. each	
Comeback x English Leicester returned 15s. 11¾d. per ewe	
less 29 lambs for 12 weeks at 2s. each	
" 22 lambs for 24 weeks at 4s. each	
" 17 lambs for 13 weeks at 2s. 2d. each	} 2s. 10d. equals 13s. 1¾d. per ewe.
" 21 lambs for 20 weeks at 3s. 4d. each	
Comeback x Ryeland returned 16s. 10d. per ewe	
less 20 lambs for 13 weeks at 2s. 2d. each	} 2s. 8¾d. equals 14s. 1¼d. per ewe.
" 19 lambs for 20 weeks at 3s. 4d. each	

With these allowances made, we find that the ewes mated to the Dorset Horn ram show an increased return of 4¼d. per head over those mated to the Southdown ram, and the latter have only 1½d. per head increase over those mated to the Ryeland ram. The return from ewes mated to the Suffolk ram is also improved, and equals *that from ewes mated to the English Leicester ram, both being 1s. 5¼d. less than* return from ewes mated to the Dorset Horn ram.

In conclusion, the experiment shows that the raising of Fat Lambs on the improved pastures during the two seasons has been quite satisfactory.

In handling Fat Lamb flocks on these lands it is imperative to graze them on well fertilised pasture. The fields used for this experiment have received 1cwt. 45 per cent. superphosphate per acre annually for the last six or eight years, and during the two seasons under review have carried 2.98 sheep per acre per annum, which includes 2.28 sheep allowance for ewes, and 0.70 sheep allowance for the time on which lambs were grazing.

Rotate the grazing of fields, and drop the lambs sufficiently early to enable them *to be marketed before the grass seeds become troublesome.*

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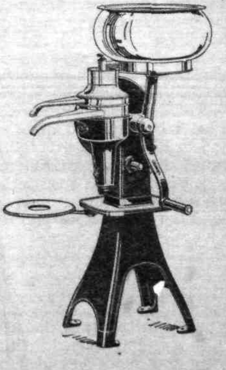

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THE STATE EXPERIMENT ORCHARD, COROMANDEL VALLEY, NEAR BLACKWOOD, SOUTH AUSTRALIA.

[By GEO. QUINN, Chief Horticultural Instructor.]

(*Continued from page* 1539.)

ROOTSTOCKS IN RELATION TO THE OCCURRENCE OF BITTER PIT IN APPLES.

The Problem of Bitter Pit.

In a short introductory statement on "the Prevention of Bitter Pit," contributed to "an Annotated Bibliography on Bitter Pit" issued by the Imperial Bureau of Fruit Production last year (1934), Dr. Barker, principal investigator at the Low Temperature Research Station, Cambridge, in outlying the results of the world-wide work covered in the publication, made the following comment:—"In spite of the numerous investigations on the disease which have been carried out in different parts of the world, bitter pit remains a major source of wastage in certain varieties of apple, and critical information as to the causal factors is still lacking. Indeed, it is not even known whether the injury to the cells which eventually results in their death and browning actually occurs while the apple is still on the tree or whether it may also occur after the fruit is picked."

Dr. Barker briefly referred to the research work conducted during recent years by Carne and others in Australia, having for its object the lessening of the wastage occurring amongst apples exported from the Commonwealth. It has been claimed by these investigators that by harvesting the fruit when it has arrived at a certain stage of maturity the further development of the disease in the apples during overseas transport or in land storage will be largely averted. As Dr. Barker remarked, to bring this procedure to practical demonstration on a commercial basis some simple and reliable method of determining when the desired stage of maturity has arrived must be evolved and the apple growers educated to the use of same. The present writer has endeavoured to induce the apple growers of this State to utilise the starch staining method recommended by Carne and his co-workers, but found its practical application to even a limited range of export varieties resulted in discrepancies being revealed which not only confused the growers but unfortunately aroused suspicion in their minds as to its reliability in respect to any of the kinds usually exported. The use of a colour chart has been received with greater confidence by the practical apple growers, but this may be due to the fact that certain colour changes in the ground colour of the skin of the apple, as well as of other fruits, has long been observed by them to take place at the approach of maturity in the fruit.

Whilst the establishment of the above objective on a reliable working basis is a most laudable and desirable subject for research, and its early achievement highly important to the welfare of the apple growing industry in this and many other countries, it cannot avert those extensive preliminary losses which arise in the orchard from the destruction and wastage caused by this disease in one of its forms before the apples have reached either maturity or the packing shed. The data produced in this

report on the trials conducted at the Blackwood State Orchard from 1908 to 1934 will, it is hoped, go some way towards showing the true extent of this wastage over a lengthy period of years in so far as certain varieties grown for export in this State may be concerned.

Dr. Barker's review shows that the results of observations made by many investigators into certain characteristics of Bitter Pit indicate that they closely coincide in all countries. These observations chiefly consist of recording its increased occurrence with the increased size of the individual apples, which is usually found in years of light yields and particularly from young or vigorous trees. "For the investigator seeking to prevent Bitter Pit there is then," writes Dr. Barker, "the choice of experimental work along many lines, and we may usefully consider which lines appear to give most promise of success." As judged by the possibility of quick results there seemed to Dr. Barker little doubt that "investigations of the effects of the following factors, viz., maturity at picking, position of fruit on tree, size of crop, type of pruning, and effect of blossom or fruit thinning are particularly likely to bring success."

He further adds, "Any results obtained in these investigations should be readily applicable commercially since, unlike climate and soil conditions the above factors are all readily controlled by the grower. In order to ascertain the influence of rootstocks, soil conditions, rainfall, &c., comprehensive orchard and storage investigations are required." "Hitherto," he states, "little attention appears to have been given to the question of the variation in susceptibility of different trees to Bitter Pit." "So far as we are aware," he writes, "it is not known to what extent apparently similar trees growing adjacent to one another may differ in susceptibility, nor whether trees which are susceptible in one season are also highly susceptible in another." It may be a singular coincidence only, but with the exception of cold storage trials some data on practically each of these lines have been annually collected from plots of trees growing in the State Orchard at Blackwood extending in some instances for upwards of two decades.

It is doubtful, however, that with the exception of the figures tabulated in this present article which deals with certain rootstocks and combinations of same, whether this carefully detailed data ever will be presented for the information of those who are studying or suffering losses from this disease here and abroad.

The "Annotated Bibliography on Bitter Pit," which has been quoted, contains a brief outline of the writings on this disease of no less than 123 authors and observers located in 10 different countries. Amongst these the names of well known scientific and technical writers freely appear from Great Britain, United States of America, Australasia, South Africa, and Germany, and to a lesser extent from Canada, France, Russia, and Bulgaria showing, as they do, that the seriousness of the disease is practically world-wide.

The first authenticated reference to it appeared in 1869 when a German writer, Jaegar, published an account of his observations of the so-called "Stippen" disease in the *Illus. Monatshefte fur Obst und Weinbau.* It should interest South Australian fruitgrowers to know that it was an amateur investigator of plant diseases and fruit pests in this State who shortly afterwards described its presence in apples from South Australian orchards.

In 1886, Frazer S. Crawford, Government Photolithographer by profession, but ardent student of economic biology by choice or hobby, published by the direction of his Ministerial head (Commissioner of Crown

Lands) a booklet containing the results of his studies of the injuries arising in local orchards from the Fusicladiums (Black Spot or Scab) of apples and pears, codlin moth, the latter then only recently introduced, and several other more minor pests affecting the fruitgrowers' crops. Amongst these latter, on page 53, under the heading of "Spotted Apples," Crawford wrote, "For several years I have received apples from various parts of the colony covered with slightly depressed roundish spots or pits about ⅛in. in diameter. In most cases the colour of the spots was normal, but in one case the spots were brown. Beneath the pits the flesh was coloured brown for some distance towards the core, but gradually lessening in width until the altered part disappeared. This part, although decayed in one sense, did not cause adjacent parts to rot as in ordinary vegetable decay. Although it seems natural to suppose that the diseased spots are of fungus origin, yet I could not detect with the microscope any mycelium permeating the tissues." Although his was the first recorded reference to this disease in Australia, Crawford relates that "one grower asserted that the disease appeared owing to the trees being young and making too much sap when planted in a damp situation." The late Hon. Thomas Playford, who was an apple-grower, also informed Crawford he had seen this disease in apples as early as in 1860 in the Mount Lofty Ranges near Adelaide.

In the light of subsequent investigations the assertion of the first grower quoted, although somewhat crudely stated, has proved to be practically correct as to one of the principal predisposing factors which the world over has been stated to have operated whenever the Bitter Pit appeared in apples. Crawford's description of the disease is also sufficiently accurate to identify his "spotted" or "pitted" apples with what is now known as Bitter Pit. The context of his article indicates that his description was drawn chiefly from apples which had been stored away in a seemingly sound condition. He further stated that certain varieties were deemed more susceptible than others, particularly if taken from a small (short) crop, when the individual apples were large. He records that growers asserted that "even in normal crops the large fruits often developed the disease whilst the smaller ones rarely did so." In fact, notwithstanding all that has been placed on record relative to the circumstances surrounding the occurrence of this disease since 1886 Crawford's statements and observations stand undisproved and may be accepted as an outline of present-day knowledge on that phase of the subject.

In 1891 L. R. Jones, in the fifth report of the Vermont Agricultural Experimental Station, U.S.A., described the disease for the first time in America and called it "Fruit Spot," but later "Baldwin Spot," owing to having observed the peculiarly great susceptibility of the fruit of the favourite American variety of that name to suffer wastage from the defect.

A year later (1892) Dr. N. A. Cobb, Plant Pathologist to the Department of Agriculture of New South Wales, referred to a "mysterious disease" in New South Wales apples which transpired to be a closely related form of the defect which is now called "Blotchy Cork" by recent investigators in the United States of America and Australia. In 1895 Cobb again mentioned the disease in the *Agricultural Gazette* of New South Wales and referred to it as "Bitter Pit" owing to a bitterness which was always detectable in the brown dead cells of the tissue lying beneath the epidermis of the apple. Cobb, however, in the absence of any evidence of a causal organism in the "pits," surmised that these forms of disease arose from the punctures previously

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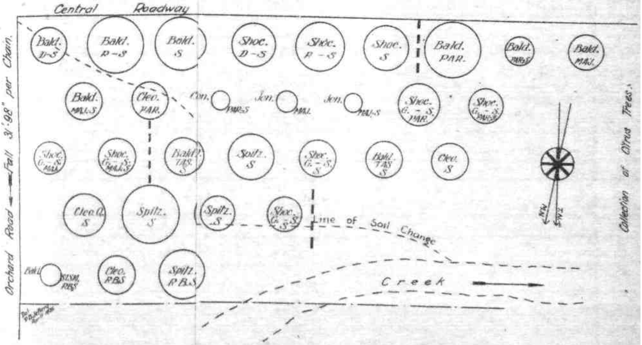
spread of each tree.



inflicted on the immature apples by insects and consequently proposed that the term "stigmanose" be applied to the diseased condition found in these "pits" or "spots."

In the January issue of the *South Australian Journal of Agriculture,* 1905, pages 305-309, the present writer outlined the local position relative to the occurrence of this disease and made suggestions for the avoidance of certain cultural treatments which it was claimed had predisposing influences wherever the defect was most frequently found. A list of varieties most commonly grown in the orchards of the State was presented in tabulated form in the order of their respective suspected degrees of susceptibility to the occurrence of Bitter Pit in the fruits. Lines of orchard research such as the selection of rootstocks and scions from varieties or trees deemed to bear fruits which were either immune or highly resistant to the disease, were advocated.

In so far as the apple-growing industry of Australia was concerned, it was during these early years of the present century that attention was most persistently drawn to the losses arising from this disease in the orchard as well as in the exported and locally stored apples. In fact, it may be claimed that the tide of complaints from overseas markets continued to rise in an increased ratio to the then appreciable advances being made in the quantities shipped abroad. In the States of New South Wales and Victoria where the Departments of Agriculture each employed a Plant Pathologist, the fruit-growers' associations requested that investigations be made into this disease which had now been declared to be due to neither insect, fungus, nor bacterial activities. Scientific investigators in all parts of the world had expressed this opinion. Impatient of delay, the Australian National Fruitgrowers' Conference held in Melbourne in 1908, brought the subject under the notice of the Federal Minister of Customs and the meeting of the same body in Perth in the following year caused it to be brought under the notice of the Annual Conference of the State Ministers of Agriculture "with a view to the appointment of a board to consist of two growers and one scientist from each State who should be instructed to endeavour to ascertain the cause, nature, and preventive means of Bitter Pit."

The Ministers' Conference discussed the proposal and suggested as the trouble was Commonwealth wide the Commonwealth Government be asked to contribute half the cost of an investigation and the States of Tasmania, Victoria, New South Wales, South Australia. and Western Australia share equally the remaining half cost. The final result of this agitation was that the Commonwealth Government offered to contribute £1,000 per annum for four years towards the research, and accepted the recommendation of the Conference of Australian Fruitgrowers' Associations held in Hobart in 1910, that the services of Mr. D. McAlpine, the then consulting Plant Pathologist to the Victorian Department of Agriculture, be secured to undertake the investigation.

In August, 1911, this investigation began and was terminated in 1916. During this period of five years Mr. McAlpine, with that industry, zeal, and care which characterised all of the work of this pioneer in Vegetable Pathology in Australia, collected together into five annual progress reports practically all that was known relative to the disease up to that period.

The time was evidently too short to permit of much definite scientific research being accomplished, particularly by a single investigator. Besides collecting and co-ordinating much scattered evidence—mostly based on opinions and not on the results of carefully guarded experimental data—this investigation did not carry the expectant orchardists much further

towards the desired goal of knowing how to avoid or prevent the losses due to the occurrence of Bitter Pit in their apple crops. As Dr. Barker has pointed out the cause is still unknown, though the nature of the defect produced in the apple is better understood and many of the characteristics displayed by it proved to be constant all the world over wherever the disease occurs. McAlpine's conclusion as to the primary cause of the disease (see page 66, fifth report, 1915-16) does not carry us much further than that contained in the assertion of the grower quoted in Crawford's statement compiled in 1886. Whilst McAlpine, like most of the more recent investigators, claimed to have solved the problem of how to avoid the wastage arising from the development of this disease in apples during land storage or overseas transport, the major problem of how to prevent or definitely modify the occurrence of Bitter Pit and its allied "cork" diseases in the orchard remains unsolved.

Following upon the statement published by the writer in the *South Australian Journal of Agriculture* in January, 1905, in which the failure thus far of scientific investigators to determine the presence of any causal organism in connection with the diseased tissues of the apples affected by Bitter Pit was duly noted, steps were taken to place under test certain items of orchard research referred to therein. In 1907, as soon as the nursery was established on the site of the then recently acquired land of the State Orchard at Hackney Road, Adelaide, this was one of the first matters taken in hand. The propagation of a series of apple trees was begun, with the object of testing the preventive effects, if any, of certain rootstocks and/or intermediate stem-pieces on the prevalence of Bitter Pit in the fruits of scion varieties declared either to be highly or only moderately susceptible to that disease when grown in the usual manner on Northern Spy rootstocks in commercial orchards. The selection of the varieties of apples from which these rootstocks and stem-pieces were drawn was based on the assumption that in the absence of a causal organism in the diseased lesions, the defect known as Bitter Pit in the fruit must arise from some inherent defect in the particular variety of apple tree which consistently bore such diseased fruit when subject to certain observed environmental conditions or influences.

It was argued, therefore, that to use as a rootstock a variety of apple, the fruits of which displayed a high degree of susceptibility to this disease, might reasonably be suspected of exercising a predisposing or aggravating influence on that tendency in any other variety which also displayed susceptibility to develop Bitter Pit in its fruits. Conversely, it was assumed that a rootstock or intermediate stem-piece of a variety, the fruit of which displayed immunity from, or high resistance to, the development of Bitter Pit, might be expected to exercise some restraining influence on the occurrence of the disease in the fruits of a variety in which it ordinarily appeared.

The Stocks Selected for Trial.

In McAlpine's first progress report for 1911-12, pages 31-33, closely comparative lists of popular varieties of apple are quoted from all States f the Commonwealth. In respect to most of the sorts which recur in lists the classification as to the respective degrees of susceptibility fruits to Bitter Pit shows a remarkable uniformity in all instances. as previously remarked, these classifications were not based on ntings or weighings of the diseased portions of the crops. Still mitted that some credence should be given to the conclusions

reached in matters of this kind by a number of independent observers, more especially when they were scattered over the apple-growing areas of a continent.

The three varieties selected for rootstocks in the Bitter Pit test plot established in the Blackwood State Orchard were all classed as "Blightproof," *i.e.*, they were considered to be practically immune from the injuries caused by the so-called Woolly Aphis or American Blight, known to science as *Eriosoma* (*Schizoneura*) *lanigera*, Haus.

They consisted of the *Northern Spy*, representing the rootstock commercially adopted throughout Australasia in the propagation of apple trees. The fruit of this variety is listed in McAlpine's report as being badly affected by Bitter Pit in all the States of the Commonwealth.

The *Winter Majetin*, which produces a medium-sized, partially-green or dull brownish-red coloured fruit, was valued at one time as a good late-keeping apple for culinary purposes. It was tried in the early days of experimenting with Blightproof rootstocks, but, owing to propagational disabilities, it fell into disfavour and few trees of the variety are now found in the orchards of this State. Its fruit is listed by McAlpine as being observed for the occurrence of Bitter Pit in the States of Victoria, New South Wales, and South Australia only, and recorded as either very slightly or seldom attacked by this disease.

The third rootstock variety is known as Cole's Blightproof Paradise. It is an apple claimed to have been raised and distributed by John C. Cole and Son many years ago when that firm was amongst the most prominent Victorian nurserymen operating near Melbourne. This firm specialised on fruit trees and are remembered chiefly because of having produced three new varieties of pears which are still in commerce, known throughout Australia as Winter Cole, Madam Cole, and Elizabeth Cole.

This apple tree was brought forward as a dwarfing and Blightproof stock, but from only a limited experience with its use, the writer doubts if the former claim can be sustained, at any rate, when the trees are planted in deep rich soil. It certainly is not to the writer's knowledge affected by Woolly Aphides in South Australian orchards, neither has its fruit been found to be affected by Bitter Pit. The tree, however, has not been widely planted as a rootstock, nor grown for its fruits.

In the older nursery beds at the Blackwood State Orchard some 50 trees placed in reserve for propagating purposes at the time these Bitter Pit trials were inaugurated have grown up like a hedge in the deep rich alluvial soil. These trees have cropped very prolifically for many years, during which time neither the Orchard Manager nor the writer can recall having seen any evidence of Bitter Pit or allied "cork" diseases in the sweet, very white flesh of these roundish, oblate, below medium-sized pale-green skinned fruits.

The varieties selected for the intermediate stem-pieces, where such were used in the first propagations made in 1907, consisted of Dunn's Seedling and Rokewood, both of which bear firm-fleshed fruits and both are seedlings of Australian origin. At the time of selecting these two commercial varieties, the writer had not seen the "Bitter Pit" in any form attacking their fruits. In later years, however, fruits of the Dunn's Seedling, originating from different orchards in South Australia, have occasionally been noted as somewhat freely attacked by it. McAlpine's census of 1912 returns it as "free" in New South Wales and "slight" or "seldom affected" in Victoria, and South and Western Australian orchards. It is not mentioned in lists compiled in Tasmania and Queensland. Rokewood

is listed as "free from Bitter Pit" in returns from New South Wales and South Australia, but there is no mention of it in lists from the other four States, although at the time it was largely grown in Western Australia for its long keeping and valuable culinary properties. In the context to these lists, first report, page 47, McAlpine states "Both Rokewood and Monroe's Favourite (Dunn's Seedling) have been found with Bitter Pit in Victoria." The Rome Beauty variety was used as an intermediate stem-piece in the final plantings. The Northern Spy stocks planted in 1911 were budded *in situ* with this variety in 1912. The fruits of this variety are seldom attacked by the ordinary smallpox-like pittings of this disease, but at times larg. irregularly shaped shrunken areas appear on the periphery, usually towards the calyx end of the apples. McAlpine figures this in his first report, 1911-12, Plate VII., Figs. 32-34 and 37, under the name of Crinkle or Confluent Bitter Pit—a name he had suggested as early as 1901 for this peculiar "pigface"-like formation. In Studies of Bitter Pit, published as C.S.I.R. Bulletin No. 41 in 1929, Carne and his co-workers refer to this defect as "Crinkle Cork." As this defect would appear to be peculiar to a very few varieties of apple, chiefly Five Crown Pippin, Rome Beauty, and Rymer, and then only during some seasons and in scattered localities, it was not deemed to be of equal importance as those more distributed defects classed by recent investigators as various forms of "Cork" and "Pit." The use of Winter Majetin and Cole's Paradise varieties in the role of intermediate stem-pieces was based on the assumed resistance of the fruits of these sorts to Bitter Pit, and on their reputations of possessing some tendency to retard a vigorous growth on the part of varieties grafted on them.

The material used in propagating the trees for these trials was obtained within the State. That of Northern Spy, Winter Majetin, and Cole's Paradise rootstocks was obtained from the nursery of Mr. H. Wicks, sen., of Riverside Nurseries, Payneham, near Adelaide. The trees were developed from segments of the respective kinds grafted on pieces of their own lots. The scion wood used for the intermediate stem-pieces of Dunn's Seedling, Rokewood, and Rome Beauty varieties was procured from trees of their respective sorts grown in the orchard of the late Hon. G. R. Laffer, near Belair, approximately two miles distant northward from the State Orchard at Blackwood.

The scions for the varieties placed under test for Bitter Pit consisted of Baldwin, Cleopatra, Cleopatra Q, Esopus Spitzenburg, Jonathan, and Shockley. Three of these represented at the time our leading varieties of export apples, whilst the others were also exported or grown freely for local markets.

With the exception of Cleopatra Q, all of the parent trees grew in Mr. Laffer's orchard at Belair. They were well matured trees and known to the writer to have produced fruits, more or less, according to the varieties, affected by Bitter Pit over a period of some years. The scions of Cleopatra Q were taken from an old, somewhat stunted tree of this variety which grew in the private fruit garden of the writer in an Adelaide suburb.

In the fruits borne by this tree Bitter Pit had not previously been seen. This tree occupied an indifferently cultivated, dry corner in the garden and the apples were usually somewhat tough and below normal size for the variety. Owing to occasional growers claiming to possess trees of Cleopatra, the fruits of which escaped Bitter Pit, it was assumed by the writer that possibly different trees of an ordinarily susceptible

variety might possess some degree of immunity from, or resistance to, the disease. The opportunity of testing this assumption was taken, and in due time scions obtained, though with some difficulty owing to the very restricted annual growths present on the branches.

There is an interesting sequel to the earlier history of this tree which may be briefly stated here.

Two or three seasons after these first scions had been used in propagating trees for these tests the land in which the parent tree stood was levelled and broken deeply prior to manuring it, and planting a crop of summer beans.

The bean crop was freely irrigated from time to time and the apple tree also participated in the increased supply of moisture and nutriment. It responded in the form of developing a vigorous growth of shoots and foliage. In the following fruit season the crop of apples, though abundant, consisted mostly of large fruits, the majority of which were ruined by Bitter Pit or Blotchy Cork, as defined by more recent investigators.

In the second series of plantings those trees worked direct on rootstocks of Cole's Paradise and Winter Majetin were planted in 1910 carrying dormant buds cut from the same parent trees of the same fruiting varieties as in Series I., whilst those having intermediate stem-pieces of the Paradise and Majetin grown on Northern Spy rootstocks were budded in 1911 to the fruiting varieties obtained from the sources enumerated above.

This second series of plantings consisting of 24 trees occupies the western portion of the first row, the whole of the second row and a couple of spaces at the eastern end of the third row. The third series consisting of 30 trees, *i.e.*, six trees of each of the more susceptible varieties—Jonathan being omitted—all worked direct on Northern Spy rootstocks occupy the remainder of row 3 and the whole of row 4 in the plot. These trees were also planted in 1910.

The fourth series comprises two trees of each of five distinct varieties—Cleopatra Q now being omitted—were all worked on intermediate stem-pieces of the Rome Beauty variety grown on Northern Spy rootstocks.

These were planted out in 1911 and budded to the respective scion varieties in February 1912.

It should be noted that in each series the material for the respective rootstocks and stem-pieces were taken from the same parent trees, and when the budding of the scion or fruiting varieties took place the budwood was cut from the same parent trees which were growing in Mr. G. R. Laffer's orchard near Belair. It will be seen, therefore, that in propagating the trees contained in each series of the plantings, the whole of the material utilised was, in a genetic sense, as nearly identical as it was possible to obtain. The variations which are deemed to occur from the use of seedling rootstocks, or to arise from grafting with scions taken from the growths of different trees of the same fruiting varieties, should have been eliminated by the procedure followed.

With the exception of the limited numbers of trees of each of the fruiting varieties worked on the respective rootstocks—other than on the Northern Spy—and intermediate stem-pieces, the planning of the tests in most respects would appear to meet the principal requirements of modern horticultural reseach plots.

At the time of planning these tests it was hopefully imagined that, as had been achieved in the case of circumventing the Woolly Blight by the use of the blight-proof rootstocks a generation or two previously, some markedly outstanding difference in the proportion of Bitter Pit affected apples might be detectable amongst the data collected from the trees growing on one or

more of the various combinations adopted, the significance of which would prove unmistakable. If modern statistical methods of analysis are found applicable whereby the exact differences in results may be determined from the data herein presented, it is hoped that someone more competent than the writer will find the appended, though much condensed tables of figures, sufficiently informative to render the effort worth while. The Bitter Pit stock trial plot is located at the eastern boundary of the orchard and on the Northern side of the principal roadway which runs through the plantations along the lower half of the southern slope and is shown as Block E in the general plan of the orchard which was published in the first instalment of this report. It is a long, narrow, rectangular strip with the fourth and fifth rows broken somewhat along its northern side by the intrusion of a pumping plant consisting of engine-house, well and large tank-stand, as well as by the sweeping curve of a local creek which traverses the full length of the orchard from east to west. Its longest sides which run almost east and west, measure 420ft. and have a fall towards the west of about 26½in. per chain whilst its shorter sides or ends measure some 86ft. 8in. in length, and fall to the north at an average rate of approximately 32in. per chain. The much greater proportion of this steeper fall occurs between the first and fourth rows from the central orchard roadway.

In the sketch plan of the plot a "dash" line marked "line of soil change" roughly indicates the position in that respect, as north of this line the land becomes almost flat.

Eleven separate examinations were made of the surface and subsoil profiles, viz., in five places along the space between rows 1 and 2, in three positions, between rows 3 and 4 and in three places along the northern margin immediately outside the spread of the trees in row 5.

Between rows 1 and 2 the surface soil ranged between a depth of 9in. and 18in.—average 12½in. This is a dust-like combination of particles of sand and clay in an extremely fine state of subdivision, being dry in the summer when surface tilled, but setting hard in the unbroken portion beneath the tillage depth. It is only slightly humified in the top 9in. and carries a thin band of small nodules of ironstone gravel in the lower portion of this layer. The subsoil consists of a bright chrome-yellow coloured clay, crumbly when moist, but very hard set when dried out. Ironstone particles were scattered through this clay. This clay layer ranged in depth from 29in. to 32in.—averaging 30in. No rocky formation was met in these tests. Between rows 3 and 4 the surface soil varied in depths from 18in. to 21in.—averaging 19in. It varied from 21in. of dark humified loam at the eastern end to a dark sandy loam intermixed with ironstone gravel at the western end of the plot. The subsoils ranged from 13in. to 32½in. in depth—averaging 24.8in. They varied from a pale yellow hard clay beneath the deep humified surface deposit at the eastern end—within the line of "soil change" on plan—to the deep chrome coloured, crumbling, gritty clay, with broken stones intermixed, further towards the western end.

Outside row 5 the surface soil consisted of dark almost black highly humified clayish loam, evidently an alluvial deposit from the local creek. This layer was of very variable thickness ranging from 14in. to 24in. in depth—average 17½in. The subsoils also varied from a depth of 16in. to 32in. before the shelving mudstone (slate) rock was met. The average depth was 24½in. above this stone. The subsoil consisted of dark greyish clay at the eastern end and gradually running into the deep chrome yellow, gritty clay towards the western half of the main fall of the plot.

In 1912 two samples each of surface soils and subsoils each to a depth of 9in. were taken from between the first and second rows at points about one-fourth of their length from the eastern and western ends respectively. These were submitted to the Department of Chemistry for analysis, and with the exceptions of Potash and Lime the constituents in both positions showed only slight variations. The average percentage of the principal elements of soil fertility contained in them were, with the exception of potash in the subsoil, below what has been deemed essential to soils of average fertility in older countries. The averages are as under:—

	Nitrogen (N).	Phos. Acid (P_2O_5).	Potash (K_2O).	Lime (CaO).	Fine Earth (Less than 1 m.m. in Diameter).
	%	%	%	%	%
Surface soils	·0894	·0555	·2535	·231	92
Subsoils	·0530	·0585	·3175	·294	87·75

These surface soils approximate, however, in the percentages of these constituents to those quoted from 10 typical South Australian orchards and vineyards as stated in the first instalment of this report published in the *Journal of Agriculture of South Australia* for March, 1935.

The Development of the Trees.

The trees in this plot were, as in previous plots described in this report, set out at distances of 20ft. apart on the septuple or equilateral triangular system of arrangement. During the earlier years which preceded the fruiting period the trees in each of the series displayed, with few exceptions, average vigour—gauged by the standard of development afforded by the growth of hundreds of apple trees scattered throughout various blocks in the orchard area.

Owing to the ages of the trees planted in the respective series, and the individual growth characteristics of the varieties differing, a considerable lack of regularity in the sizes of those even of the same variety, was noticeable throughout the plot. The usual pruning deemed desirable for obtaining a well-balanced top was applied to all of the trees, particularly during the pre-fruiting period. As fruit production increased, and neither manures nor irrigation being resorted to, the vigour of vegetation gradually subsided and by the time normally full crops were being harvested the pruning had mainly receded into merely an annual, light topping of the leading shoots and shortening back of unduly long or declining laterals during the dormant period of each year. Whilst the crops were still limited the trees were relieved of apples seen to be definitely "pitted" and from time to time windfalls were collected with scrupulous care and the diseased specimens sorted out and recorded. This procedure was applied to each individual tree in the whole plot. For a number of years a record of the apples affected by Bitter Pit—or Cork—from many of the horizontal laterals and branches, as apart from those borne on the vertical limbs, was kept in respect to a number of the trees. Up to the season 1920 the fruit when finally harvested was carried to the packing shed, graded into sizes rising by half inches from 2in. or under in diameter up to 3½in. and then sorted into "pitted" and "sound" groups and thus separately weighed and recorded from each tree in the plot. The "sound" fruit was then kept in a fruit store built with walls and ceiling insulated with a 4in.

thickness of solidly rammed cork shavings and fitted with controllable ventilation apertures entering from beneath the floor, but not otherwise artificially cooled. If not entered frequently during the daytime, the temperature usually ranged from 60° F. downwards from the harvesting period (March-April) onwards. These fruits were again examined at intervals of from 14 days upwards over a period extending up to two months and the further development of Bitter Pit recorded.

It should be explained here that in collecting data the term "Bitter Pit" is used in its widest sense throughout this report, and no distinction made between the forms now referred to by later investigators as separate diseases under the terms of "Blotchy Cork," "Crinkle Cork," "Drought Spot Cork," "Internal Cork," "Tree Pit," or "Storage Pit." All of these forms as defined by Carne and his co-workers have been more or less noted, but those principally in evidence in the apples recorded from the trees in these trials would conform to "Blotchy Cork" when found before or during harvesting time and to "Storage Pit" at a later period.

As the crops began to increase in magnitude the details relative to the fruits borne on horizontal and upright branches respectively and of the storage and subsequent examinations of the individual apples had to be abandoned owing to the staff available not being able to cope with this and the other seasonable work undertaken in the orchard. The Manager (Mr. R. Fowler) and his assistants continued, however, to record with scrupulous care the total weight of fruit borne by each tree in the plot, to grade and sort out the "pitted" from the "sound" apples, and keep a careful record of the respective weights of same in each respective grade.

As this portion of the report attempts to deal with the influence of the rootstocks only on the prevalence of Bitter Pit in the fruits, other features covered by the accumulated data are left for some future analysis. The results of the observations of all research workers and practical orchardists indicate that the occurrence of this diseased condition in apples is intimately bound up with the nature of the growth of the tree on which they are borne.

The consensus of opinions indicate that the intensity of the disease appears to increase or diminish with the vigour of vegetation in each individual tree of a susceptible kind. Fruit tree propagators generally accept the view that the influence exercised by a rootstock or an intermediate stem-piece is usually evidenced by an increased or diminished growth on the part of the fruiting variety worked thereon.

Whilst progressive measurements were not taken of the expansion of the trunk or the extension of the limb growths of each of the trees during the course of the trials, a carefully collected series of measurements was made in March, 1935, embodying the circumferences or girths of each rootstock immediately below the point of union of stock with scion and of the tree stem itself at a position between 10in. and 12in. from the ground-line.

Wherever an intermediate stem-piece was inserted the girth of this was also measured at a point midway along its length. The mean height and spread attained by the limbs of each tree was also measured and recorded. In making these latter measurements the mean accepted height represented not the altitude reached by one, or perhaps two very upright leading shoots, but the average from the whole balanced framework. The mean spread was calculated from transverse measurements made at the same altitude and approximately at right angles to each other across the greatest spread available in that direction. Viewing the trees critically in conjunction with these measurements, the writer concluded that the mean spread—notwithstanding scattered evidences of the shortening in done by the pruners

during certain seasons—of each tree's crown, may at this stage, be taken as probably the best index to the development achieved generally by the tree.

Mature trees, now somewhat stunted in their limb growths, sometimes exhibit an exaggerated thickness through the trunks, seemingly quite out of proportion to the superstructures borne thereon. It was noted that some of the trees formerly of the Baldwin and Shockley varieties which in 1927 and 1929 had been top grafted on the main limbs about a foot above their junctions with the trunk to the vigorous growing Tasma, Statesman and Granny Smith varieties, thickened considerably in the trunks. It must be admitted, however, where pruning procedure has been directed towards keeping the tops of the trees within what is deemed to be economic heights and spread, their dimensions tend to assume certain artificially induced resemblances.

In the sketch plan of the plot presented herewith an endeavour has been made to show the respective developments of the trees by the mean spread of each tree's crown in the form of a circle drawn to a scale of 1m.m. to each foot of limb spread. To make the letters pertaining to each circle in the sketch plan quite clear to the reader, the following explanation is given:—The name of the scion or fruiting variety under test is abbreviated to half length, *viz.*, Bald. for Baldwin, Cleo. for Cleopatra, Jon. for Jonathan, Shoc. for Shockley, and Spitz. for Esopus Spitzenburg.

Wherever the abbreviation G.S. or Tas. or Stsm. occur below Bald. or Shoc., it is intended to convey either that Granny Smith, Tasma (sometimes called Democrat) or Statesman varieties have been top-grafted on to the limb of mature trees of one of the above-mentioned varieties.

In respect to the rootstocks used, the letters or abbreviations printed below the name of one of the scion varieties are as follows:—S equals Northern Spy, Par. equals Cole's Blight-proof Paradise, Maj. equals Winter Majetin. Wherever the intermediate stem-pieces are inserted their abbreviations precede that of the actual rootstock in that D.S. equals Dunn's Seedling on Northern Spy, R.S. for Rokewood on Northern Spy, Par. S. for Cole's Paradise on Northern Spy, Maj.S. Winter Majetin on Northern Spy, and R.B.S. equals Rome Beauty on Northern Spy. To give a single complete interpretation of the legend pertaining to the first tree in the top row it is desired to convey that Baldwin is the fruiting variety and it has been worked on to a Dunn's Seedling intermediate stem-piece which has been already propagated on Northern Spy rootstock.

It may be mentioned that in no instance, where a rootstock was united direct to the fruiting variety nor where an intermediate stem-piece had been inserted between any of the three rootstocks and the fruiting variety, could any outward manifestation of incompatibility be discerned between them.

This is in marked contrast with the recorded behaviour of the rootstocks of Cherry, Pear and Peach, excepting where the particular rootstock—as in the case of these apple stocks—was of the same genetic origin as the fruiting variety worked upon it. It was further noted that the Winter Majetin rootstocks and stem-pieces retained a smooth, dark, greyish-green, healthy-looking bark, whilst the Cole's Paradise in all cases exhibited a somewhat roughened brownish appearance. These differences in appearance was so well maintained that little difficulty was experienced in tracing the identity of the rootstocks or stem-pieces originally used in the propagation of these now mature apple trees.

(To be continued.)

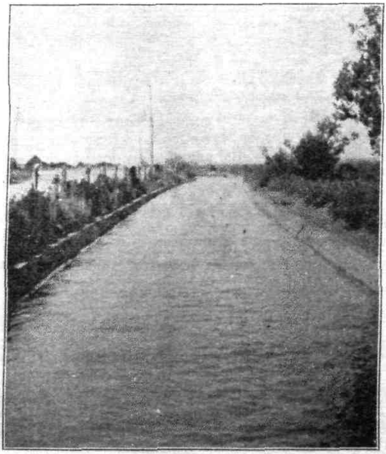
IRRIGATION AND DRAINAGE.

[By F. R. ARNDT, Horticultural Instructor of the Murray Irrigation Areas.]

(A paper read at the Conference of River Murray Branches of the Agricultural Bureau, Moorook, June 20th, 1935.)

Although irrigation has now been practised along the Murray Valley for upwards of 40 years, and much experience has been gained in the art of applying water to the land, it is still a subject that presents considerable difficulties to fruitgrowers, and there are still many problems connected with it that are only partially solved.

Indeed, during recent years, irrigation problems have increased in many districts, and a rise in the water table—often accompanied by an accumulation of injurious salts in the root zone of the plants—has occurred in many places. An examination of the chief factors governing successful irrigation practice, and of the main causes of salt and seepage troubles, should, therefore, at the present time, not be out of place, and in this paper an endeavour has been made to show how many of the difficulties confronting irrigationists have been caused and how they may be overcome.



Concrete-lined main channel.

CONSTRUCTION OF MAIN IRRIGATION CHANNELS.

The first essential in the laying out of an irrigation area is, of course, the delivery of the water on to the land. The actual method of supplying the water, whether by means of various kinds of power pumps or by gravitation, is purely an engineering one, but as soon as the water is delivered into the main channeling or piping system, the province of the irrigationist begins.

In most irrigation areas the water is delivered to the various holdings by means of open channels. Where the land is of a sandy, porous nature, the main channels are generally lined either with lime or cement concrete, to prevent loss of water by seepage through the floor and sides of the channels, but on firmer types of land they are often just earth ditches.

Such earth channels are usually left unlined on the score of economy; but it is very doubtful if they ultimately make for true economy, for although the loss of water by seepage through the sides and bottoms of such channels is much less on firm than on loose land, nevertheless a considerable amount of water soaks through in time, and helps to build up a watertable in the surrounding country, unless the underdrainage of the land is very good.

The baneful effects of unlined main earth channels may be seen in places on the irrigation areas, where the sides of the channels and lands in their vicinity are often highly impregnated with salt, while the general rise in the water table that is taking place in such areas must to a great extent be reinforced from the seepage from these channels.

Watering vines on the furrow system.

It is advisable, therefore, that all main channels should be concrete-lined, as the planting of gums or willows along unlined channels to take up the surplus moisture—as is sometimes done, although of help—usually does not remove all of the water, to say nothing of the salt that exudes from these channels during an irrigation season.

MOISTURE REQUIREMENTS OF PLANTS.

The first thing that should be considered in the watering of a piece of land is that each plant growing upon it receives sufficient water for its needs. Where each row—or larger section of land—is devoted to one class of plant, as is usual in commercial orchards and vineyards, the moisture requirements of the individual

plants will be practically the same, and, therefore, each plant should receive as nearly as possible the same amount of water.

Rain—Nature's method of watering—gives to every plant in the orchard the same amount of water, and it should be the objective of the irrigationist to follow Nature in this respect as closely as possible.

IRRIGATION SYSTEMS.

The irrigation of orchards and vineyards is now practically confined to three different systems of watering—the Sprinkler system, the Flooding system, and the Furrow system, of which the Flooding and Furrow systems are the ones chiefly used.

THE SPRINKLER SYSTEM.

Theoretically, this is the most perfect of the various systems, as it approaches most nearly to Nature's method of watering—rain—and gives a far more even distribution of water than is possible by the furrow system. Land that is watered by this system does not require nearly so much grading as is the case where either the Flooding or the Furrow systems are used, and as the watering is applied evenly over the surface of the ground, waterlogging of the subsoil, with the danger of seepage resulting therefrom, is reduced to a minimum if the water is at all intelligently applied.

The chief advantages of the Sprinkler system may be briefly stated as follows:—

1. It gives a more even distribution of water than is possible by the Furrow system.
2. It allows for the penetration of the water into the soil to be more easily controlled than is the case with the Furrow system, so that this may be regulated in order not to extend more deeply into the soil than that reached by the roots of the plants, thus preventing the waterlogging of the subsoil.
3. It carries the fertilizing elements contained in the surface soil down to the roots of the plants, whereas with the Furrow system a great portion of the surface soil is often not wetted at all.
4. Through the downward percolation of the water, such salts as may have been drawn by evaporation to the surface of the ground or into the root zone of the plants, are carried further down into the subsoil where they are less dangerous to plant life.

SPRINKLER IRRIGATION ON A COMMERCIAL SCALE.

Advices from the United States of America indicate that Sprinkler irrigation on a commercial scale has made considerable progress in that country, chiefly in California, where a large number of citrus plantations are now watered on the Overhead system.

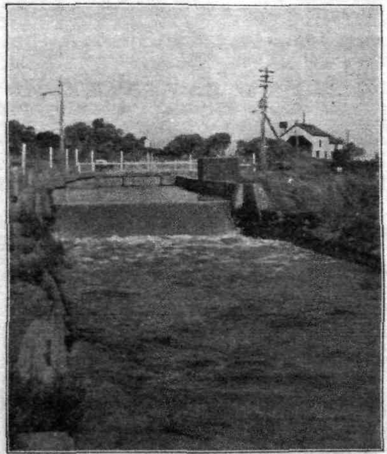
Overhead orchard irrigation is also practised to some extent in Australia, and the writer has seen this system at work on orange trees at Gilles Plains, in the Torrens Valley, near Adelaide, on the New South Wales side of the Murray, opposite Cobram, and on the plantations of Messrs. B. H. Jungfer and R. M. Wilksch, of Berri.

At Gilles Plains the water is pumped from the River Torrens, and the sprinklers worked from iron pipes by lengths of rubber hose attached to these, so that the sprinklers can be lifted from place to place when portions of the orchard have had sufficient water. At Cobram the water is pumped from the Murray direct into strong galvanized iron piping, and watered by means of the "Nunan" system, while at Berri the trees are watered by the "Pope" system—in the case of Mr. Jungfer the water being forced into the galvanized iron piping by means of a power pump, and in that of Mr. Wilksch the pipes being fed from an open channel situated on high ground and the sprinklers worked on lower levels by the force of gravity.

In all of these plantations the trees responded well to these methods of watering, making strong, healthy, green foliage, and bearing good crops. *In visiting a* citrus grove of 14 acres near Cobram—watered by means of Sprinkler irrigation—not a single yellow or mottled leaf was noticed in the whole orchard.

The reason why Sprinkler irrigation has not become more popular is due chiefly to the greater cost of installation as compared with open channel watering; and as the irrigation areas are at present laid out, the expense of substituting piping for channeling would be so great that the older methods of watering are, in most cases, likely to remain for the present.

However, owing to the success that has already attended the watering of plants by the Overhead system of irrigation, and on account of the many advantages in its favour—the chief of which is the practical elimination of the seepage problem—it seems reasonable to suppose that this method of watering will, in time, be much more widely used, and that it may ultimately supersede, to a considerable extent, some of our present methods of orchard irrigation.



Main irrigation channel at Berri.

The Flooding or Check System.

Land that is watered by the Flooding or Check system is graded perfectly level, and is then surrounded by a check bank. Water is let in at one end and the land is flooded, the check bank confining the water to the enclosed piece of land.

By this means the whole of the land receives an even watering, and on some classes of land this system of irrigation has been used with considerable success.

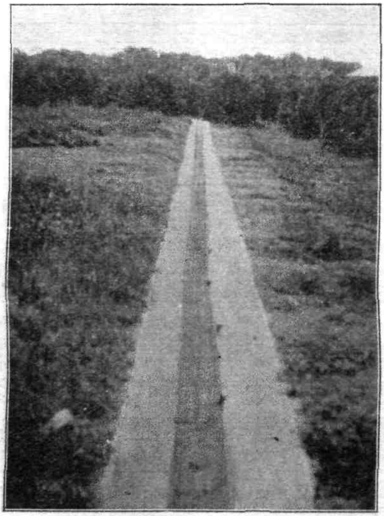
The use of the Flooding system of watering is chiefly confined to the firm, heavy soils of the river-flat lands, which absorb water only very slowly, and where the Furrow method of irrigation does not always give a satisfactory watering.

On soils of a sandy nature, however—as those usually found on the upland rises, and which absorb water very quickly—this method of watering is highly dangerous, and should be used only in exceptional instances (such as the leaching of salty lands that have been drained), because waterlogging of the subsoil may result therefrom, with the possibility of the surplus water appearing as seepage lower down the slope.

Furrow Irrigation.

Because of its greater simplicity as well as the fact that land can be more cheaply laid out for watering by this method than by any other means of applying water to the land, the Furrow system of watering is the one usually *practised in orchards and vineyards.*

By this method of irrigation one or more furrows are ploughed each side of the rows of trees and vines to be watered, and the water is allowed to run along them until the end trees or vines have had sufficient.



Concrete channel in orchard.

The chief disadvantage of this system of irrigation is that the plants situated at the beginning of a row must necessarily receive more water than those further along, and that an ideal watering, whereby each plant receives the same amount of water, cannot be attained by this method of watering.

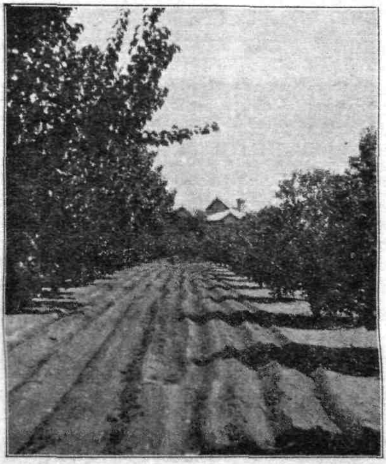
Wi...
Jungfe.It is necessary, therefore, if satisfactory results are to be obtained, that every power pun. be made to minimise the disadvantages of Furrow irrigation as much as situated on h by correctly laying out the land for watering, and by using efficient of gravity. of water application.

POSITION OF CHANNELS AND LENGTH OF ROWS.

The first thing that has to be considered in preparing a piece of land for watering where the channels are put down, for upon their position depends the length f the rows of trees and vines to be watered.

Experience has shown that on loose, sandy loam, rows 5 chains in length are ng enough, but that on hard flat land, a run longer than this may often be used ith safety.

As by the Furrow system of irrigation, the water is flowing for a considerable me past the first trees of a row before it reaches the last ones, the longer the ws are, the longer will the water take to reach the end. The result is that, on ng rows, by the time the last trees have had sufficient water, the first ones will



Orchard prepared for multiple furrow irrigation.

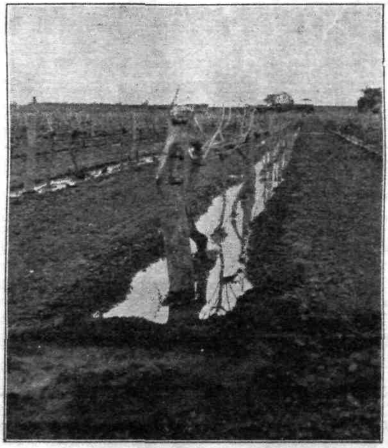
have had too much, and the surplus water, applied at the top of the rows, may come out as seepage lower down the slope, should the subsoil at any place come close to the surface of the ground.

Where the orchard has in the first place been laid out with rows that are too long for the satisfactory watering of the land, it is advisable that the irrigation runs be shortened, which may be done by dividing the rows either by means of open channeling, or by the installation of a system of concrete piping put into the ground sufficiently deep so that it does not interfere with tillage operations, by which means the whole of the land would receive a more even watering than was previously the case.

GRADE OF WATERING.

The grade along which to water is also an important factor that has to be taken into consideration when laying out the land for watering.

On sandy land, owing to the porous nature of the soil, a greater fall along which to irrigate has to be given than on firmer land, for by watering along an almost level grade on sandy land, the water sinks so rapidly into the soil that the top end of the rows of the plants watered get too much before the bottom ones have had sufficient, with the danger of seepage appearing lower down the slope in time. Therefore, it is generally not safe to water with a fall of less than 4in. to the chain on sandy rises, and on very porous soil it may sometimes be necessary to increase the fall to 6in. to 8in. to the chain, the objective to attain being that but little washing of the soil takes place at the beginning of the rows, while the *water reaches the ends of the rows in a reasonable time.*



Watering underneath vine trellis to leach salt away from stems of vines.

On firmer soils a considerably smaller grade may be used, because the soil absorbs the water more slowly; for if the grade is at all steep the water reaches the end of the rows too quickly, and the land is not sufficiently wetted. Therefore, the principle to follow in laying out the grade for watering should be—the firmer the land the lesser the grade, and the looser the land the greater the grade—so that the plants may receive, so far as the Furrow system of irrigation will allow, as nearly as possible the same amount of water.

METHODS OF WATERING.

Watering with Two Furrows to the Row.

Although the objective of good irrigation practice should be to give the land as even a watering as possible, watering by means of a single furrow along each side of the rows of trees or vines is a method that is still often used by some growers.

With such a method of watering among vines planted in rows 12ft. apart there will be two furrows in between each row; and if a spread of 1ft. is allowed in each furrow for the water to run over, then only 2ft. out of the 12ft. or one-sixth of the land, will be flooded with water. Where an irrigation of 4 acre inches is given, this will consequently be concentrated on one-sixth of the land, making a total of 24in. on the land actually flooded with water; but where the water has only run over 6in. of land at the bottom of the furrows—as is often the case—then the land flooded with water will receive an irrigation twice as heavy as this.

As the main movement of the water is downwards, a considerable portion of it —particularly in deep sandy land—will sink down into the subsoil beyond the reach of the roots of plants. In addition, the water in passing through the soil will carry some of the more easily dissolved plant foods, such as nitrates, down with it, which will thereby be lost to the plants. The greatest objection, however, to saturating the subsoil with water is that seepage may result therefrom, which will occur where the subsoil is of a tenacious nature, and is close to the surface of the ground.

LATERAL MOVEMENT OF WATER.

Besides its downward movement there is also a considerable lateral movement of water running along the irrigation furrows. Where the water soaks straight downwards, such salts as are dissolved by irrigation water are, of course, carried down with it, but in spreading laterally these salts are not carried down so deeply, and are therefore more easily brought to the surface of the ground under the influence of evaporation. Such phenomena may often be observed on land containing considerable quantities of alkali, when after an irrigation the tops and outer sides of the irrigation furrows, where no water has been applied, are often covered with salt; whereas no such occurrence is noticeable at the bottom of the furrows, where the salts have been removed by the leaching action of the water.

This lateral movement of alkali may often be traced for a considerable distance on each side of the irrigation furrows, sometimes for 1ft. to 2ft., or even further, after a heavy watering. It is apparent, therefore, that in watering an orchard or vineyard with one set of furrows on each side of the row, and in leaving the middle portion of the land unwatered, after a time a considerable proportion of the salts contained in the soil will be forced to accumulate in two belts—one in the strip of land in between the irrigation furrows, and the other along the rows of trees or vines.

Salts that are detrimental to plant life may not cause any serious damage to vegetation if they are fairly evenly distributed throughout 5ft. to 6ft. of soil, but when concentrated in the first foot of soil, may be of such strength as to make plant life impossible. It is essential, therefore, that in watering, every effort should be made to prevent the accumulation of salts at any place.

WATERING WITH MULTIPLE FURROWS.

As has been previously mentioned, when land is watered by the Sprinkler and Flooding systems, the movement of the water is in a downward and not in a lateral direction; and if the best results are to be obtained from the Furrow method, it is necessary that the water should be applied in a manner that will cause a maximum quantity to soak downwards into the soil.

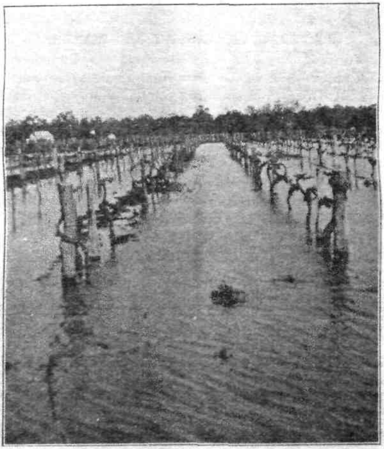
This, to a considerable extent, can be effected by watering with numerous furrows close together, whereby a considerable portion of the land, namely, all of that situated at the bottom of the furrows, is flooded. This will result in a larger proportion of the water applied soaking in a downward direction, than where fewer furrows are used, and in addition, the land will receive a more even watering.

Of course, in watering with multiple furrows, the water must not be kept running as long in each furrow as if fewer furrows are used, or the land will be over-watered. With this method of irrigation the water must be run along the furrows

fairly quickly without, of course, causing washing of the soil at the top of the rows. To prevent the accumulation of too much overflow water at the ends of the rows at one time, the watering may be so arranged that only one or two furrows in between each row of trees or vines are watered at one time.

To thoroughly wet the surface layers of the soil, but at the same time prevent the water from sinking too deeply into the subsoil, it is necessary to water with fairly large streams along the furrows for a comparatively short time, so that the land is not wetted to a much greater depth than that reached by the roots of the plants.

Regarding the distance that the irrigation furrows should be from each other to give an even watering, these may be spaced—where the land has been given a suitable grade for watering—not more than 2ft. from each other. Among vines planted in rows 12ft. apart this would give not less than four furrows to the row,



Watering vines on the flooding system at winter irrigation.

whilst among fruit trees there would be from about six to ten furrows to the row, according to the extent that the spread of the foliage had restricted the area of land where furrowing could take place.

The advantages of watering with numerous, as compared with fewer, furrows, may be briefly stated as follows:—

Firstly—The trees and vines receive a more even watering.

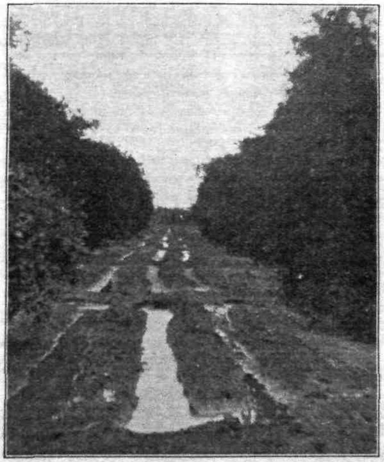
Secondly—The subsoil is less soaked with water, thereby lessening the danger from seepage.

Thirdly—The plant foods contained in the surface soil including artificial fertilisers, are not carried down too deeply into the subsoil beyond the reach of the roots of the plants.

Fourthly—Such alkalies as are contained in the soil that are injurious to plant life are thereby kept more evenly distributed, and are thus—to a greater extent—prevented from accumulating in strips on, or near, the surface of the ground, or in the root zone of the plants.

WATERING UNDERNEATH VINE TRELLIS AND FRUIT TREES.

By watering with furrows close together, the concentration of salts in between the rows of trees or vines is greatly lessened; but this is not prevented from occurring along the strip of land occupied by these plants.



Watering by semi-flooding.

It is necessary, therefore, that the land situated underneath vine trellis and fruit trees should also receive regular waterings, and by being flooded once or twice a year, any undue concentration of salt will be prevented from taking place. As the water is applied close to the trees and vines, such floodings can be more conveniently given early in the season, at the time of the first and second irrigations, than later on in the year when the growth of new foliage and the formation of fruit makes work near the trees and vines a more difficult operatio...

SEMI-FLOODING.

Another method of irrigation, which is somewhat of a combination of the Flooding and Furrow systems, and which in some cases may often be used with advantage is the Semi-Flooding system of watering.

With this system the land is generally prepared by means of the disc-cultivator, which is so set that when this is driven between the rows of plants to be watered, a shallow depression, usually several feet wide and with check-banks on either side, is made lengthwise along the rows.

On some classes of land, where the grade of watering is not too steep to cause undue washing of the soil at the beginning of the rows, this system of watering often gives good results. On loose, sandy land, however, which absorbs water very rapidly, there is a danger that the top portion of the rows may receive too much water before the lower portion has had sufficient, and that the excess water, soaking into the subsoil, may cause seepage and waterlogging of the soil lower down the slope, unless the land is well drained. This method of watering is, therefore, best adapted to land that is not of a very porous nature, and that has been laid out with a grade suitable to this system of irrigation.

DRAINAGE.

As previously pointed out, the objective of good irrigation practice should be the prevention of salt and seepage troubles, but where these have already taken place, efforts should be made to do away with them, or at least to minimise their ill-effects.

As poor drainage is the cause of alkali and seepage troubles, the most natural way to cope with the problem is to improve the drainage system of the affected land. This is usually done by means of an underground system of tile drains along which the surplus soil water is induced to flow, and whereby it is led away from the orchard or vineyard.

The first essential for a successful drainage scheme is, therefore, an assured get-away for the drainage waters. If near a river or lagoon, drainage can take place into these direct, or into a drainage system leading into these.

To cope with the drainage problem, shafts are often sunk until a layer of drift sand is struck, and the water led into these. The drawback to this system of drainage is that unless the layer of drift sand leads directly into the river bed, into a lake, or into the sea, the "sand pocket" must in time fill up with water, and consequently become useless for drainage purposes.

This has already happened in a number of instances on the Murray Irrigation Areas, the wells even overflowing in some cases during the irrigation season. For this reason, the only wise course for the authorities governing the irrigation areas to adopt is to give up the method of well drainage, and to put down a comprehensive system of main pipe drains into which the seepage waters of the various holdings may be drained, and by means of which they can be led right out of the irrigation areas into the river drainage system.

In draining an affected piece of land, trenches possessing an even fall are dug through it, and earthenware pipes are laid at the bottom of them. The depth to which the drains are put down will vary according to the depth of the watertable, the usual depth of the drains on the Murray Irrigation Areas being between 5ft. and 6ft.

In putting in the pipes, these should be laid as evenly and as closely together as possible, and the joints covered with small pieces of oiled or tarred paper, which while preventing the loose earth from getting into the pipes when the trench is being filled in, yet not prevent the water from entering in at the joints. The effectiveness of the drains can be increased, and the danger of silt entering at the joints much minimised, if a layer of coarse river sand or rubble, just sufficient to cover the pipes, is first put in before the soil that has been thrown out in making the drain is again filled in.

Where only seepage (without salt) is present, an effective system of underground tile drainage will soon lower the water table and lead to the reclamation of the land. But where salt has risen with the moisture into the surface layers of soil, the task of bringing the land back into a satisfactory state of production is a much more difficult one. In such cases, the first essential is to endeavour to remove tiliseralt by thoroughly wetting the surface soil by means of Flooding, Semi-roots of thır Multpile Furrow Irrigation, so that as much salt as possible is dis-carried off in the drainage waters. Owing to the difficulty of dis-

solving much of the salt at any one watering, this method of soil reclamation is often a very slow one, and in the case of badly affected land, may take many years.

Irrigationists have at times been puzzled by the occurrence of trees and vines situated on land affected with salt suddenly dying after the land has been drained. This phenomenon can be explained as being due to the influence of the drainage system, which has removed a considerable proportion of the moisture in the soil, but at the same time has left most of the salt behind, with the result that the salt in the remaining soil moisture is of very high concentration and too strong for the plants to withstand. It is necessary, therefore, that plants growing on salt-impregnated land should be given heavier waterings after the land has been drained than they have previously received.

THE REMOVAL OF SURPLUS WATER BY PLANT GROWTH.

Another method of lowering the watertable of seepage lands, which at times may be used with good results, is by the growing of moisture-loving plants.

Where the land is not excessively saline, probably the best kind of plant to grow for this purpose is Lucerne, which on account of its deep rooting system and its ability to absorb large quantities of water, will often appreciably lower the watertable.

Where the land is too salty for Lucerne to start, Barley may probably succeed as a first crop. This should be grown as a winter crop, and can often with advantage be followed by a spring sowing of Japanese Millet. Both of these plants are able to withstand a considerable degree of salt, and may be sown in strips along the rows of trees and vines growing on salt-affected land.

As the objective of the growing of these crops is the lowering of the watertable, they should be watered only sparsely, and after they have been established it may often be advisable not to water them at all for a while, in order to force the plants to absorb as much of the seepage waters as possible, and so dry out the ground. However, as the watertable, in receding, may leave a considerable amount of salt in the surface layers of the soil, it may be necessary, after a while, to give the land one or more comparatively heavy surface waterings, so that these salts may be washed deeply down into the subsoil beyond the reach of the plant roots.

Beneficial Results from Growing Lucerne.

Although the use of plant growth to lower a high water table has, to the present time, not been a method widely practised in the irrigation areas, several instances of its successful application have come under the writer's notice during the past few years. In one case a grower who had seepage among his Orange and Fig trees was advised by the writer to interplant the trees with Lucerne, with the result that within two years the watertable was lowered from 2ft. 6in. to about 6ft., while the trees were greatly improved in health.

In another instance a grower who had put down a tile drain, which was working well, removed a row of weak trees situated parallel to and above it, and in its place planted a 12ft. strip of Lucerne. Although this was not planted near enough for the roots to enter the drainage pipes, yet after the Lucerne was established the drain stopped running, showing that the Lucerne intercepted and absorbed the water as this drained down the slope along the subsoil.

In several other cases it was observed that the growth of Lucerne among trees and vines was helping to keep these alive, although in some places the watertable during the irrigation season was, at times, in the vicinity of 2ft. from the surface of the ground.

It is apparent, therefore, from such instances that in the reclamation of seepage lands the use of plants to remove the surplus water from the soil may often be advantageously employed, and that in place of clean cultivation the growth of Lucerne, Barley, Millet, leguminous cover crops—and at times even weeds—may be of the greatest assistance in helping to bring such lands back to profitable production.

BLACK HENBANE (*HYOSCYAMUS NIGER, L*), A POISONOUS WEED.

[By C. M. EARDLEY, B.Sc., Curator of the Herbarium, University of Adelaide.]

OCCURRENCE.

A plant recently received for identification from the neighbourhood of the Jamestown stockyards has proved to be *Hyoscyamus niger*, L. "Black or Common Henbane" (also known as "Fetid Nightshade" and "Hog's Bean"). This species is a European poison weed of some notoriety, evidently introduced into South Australia within the last fifteen years or so and, as yet, fortunately limited in its distribution. There are two earlier records of the occurrence of Black Henbane in the State, one from Alma (near Hamley Bridge) dated 1927, and the other from Wolseley in the South-East in 1921. This scattered distribution suggests that there has been more than one centre of introduction, and it will be interesting to find whether the plant has persisted and spread in these localities.

Hyoscyamus niger, L. is not recorded in recent floras of Western Australia or Victoria, though the closely related introduced species *H. albus*, L. is described in Ewart's "Flora of Victoria"; this is also poisonous. The native habitat of Black Henbane is in all parts of Europe, save the cold northern regions, including the British Isles, and extends to northern Africa and eastern India (10); it is also widely distributed in the United States and Canada (1).

POISONOUS PROPERTIES.

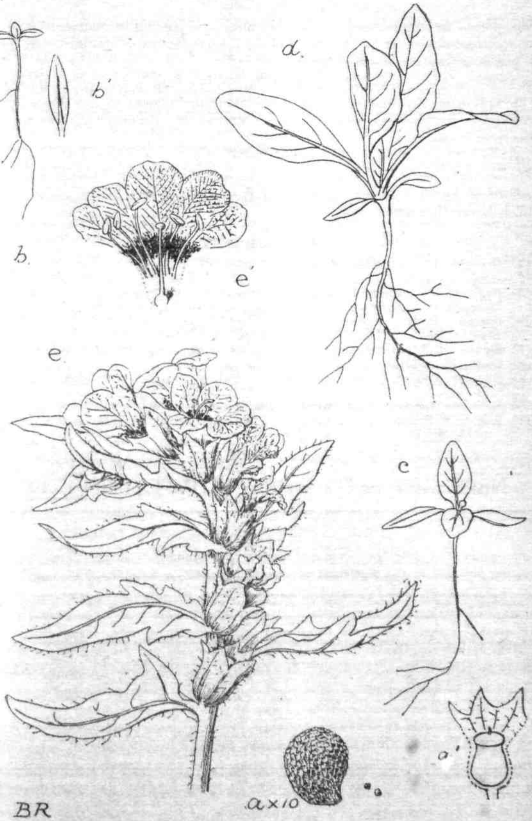
The plant has a repulsive odour and is usually avoided by cattle for this reason, though hogs die of eating the fleshy roots and fowls from picking up the seeds. All parts of the plant are poisonous, even after drying and boiling. Children have been known to die of eating the seeds (4) and adults have been severely poisoned by taking the fleshy root for chicory (2), parsnip, or horse-radish (3). The victims exhibit strange hallucinations for a time (hence the common name of "Insane Root"). Pammel (4) and Long (8) give detailed symptoms of the effects of *Hyoscyamus* poisoning in man and animals, and Pammel also describes the properties of the contained alkaloids, *hyoscyamine* and *scopolamine*, which are the active principles. The plant was formerly cultivated in Europe (9) for the narcotic drugs which were prepared from it.

DESCRIPTION.

Hyoscyamus niger, L. belongs to the family *Solanaceae*, which includes other dangerous plants such as *Datura Stramonium*, L., Thornapple, and *Atropa Belladonna*, L. Deadly Nightshade, also containing powerful alkaloids used in Pharmacy (6).

The following description of *Hyoscyamus niger* is adapted from Ada Georgia (1):—

"A coarse, ill-scented weed, stem stout, one to three feet in height, clothed with sticky hairs. *Leaves*, dark-green, three to six or more inches long, with irregular pointed lobes, wavy edges and sticky hairs on the midribs, alternate, the upper ones sessile and stem-clasping, but the lower ones stalked and drooping on the ground. *Flowers* in a short one-sided cluster at the top of the plant and solitary in the leaf axils; they are funnel-shaped, somewhat unequally five-lobed, nearly two inches broad, *the corolla is greenish-yellow with throat and lobes netted with purple veins*; stamens five, emerging from the corolla and bent downwards, calyx *urn-shaped, with five pointed lobes and five ribs; it enlarges to enclose the oblong capsule*, which is about half an inch long, two-celled *and opens transversely around the top, the latter falling off like a lid*, spilling the numerous seeds. These are kidney-shaped and brown with a strongly netted surface."



Henbane (*Hyoscyamus niger* L.). a—Seed, natural size and x 10. a'—Capsule, natural size. b and b'—Seedling, first stage and seed leaf, x 1. c—Seedling, second stage, x 1. d—Seedling, third stage, x 1. e—Flowering and fruiting branch, x 1. e'—Flower opened to show stamens and pistil, enlarged.

(*After H. C. Long.*) "*Poisonous Plants on the Farm.*"

The character of the fruiting calyx and the method of opening of the seed capsule should be noted as making the plant easy to identify when in fruit. (See Fig.)

CONTROL.

The plants are annuals or biennials, blooming and seeding in summer and autumn, and propagate by seed. A method of control, therefore, is to eradicate and destroy the plants before the seeds mature.

It is a pleasure to acknowledge Mr. J. M. Black's help in confirming the identity of the specimen, and that of Mr. E. W. Pritchard, Botanist to the Department of Agriculture, in making available one record of the earlier occurrence of *Hyoscyamus niger*, L.

SUMMARY.

Hyoscyamus niger, L., a well-known poisonous weed not hitherto included in the flora of South Australia, is reported from three places in the State, together with a description and figures.

BIBLIOGRAPHY.

(1) Georgia, Ada. Manual of Weeds, 1914, p. 373.
(2) Henslow, G. Poisonous Plants in Field and Garden, 1901, p. 124.
(3) Long, H. C. Plants Poisonous to Live Stock, 1917, p. 51.
(4) Long, H. C. Poisonous Plants on the Farm, 1927, page 30, fig. 23.
(5) Pammel, L. H. A Manual of Poisonous Plants, 1911, p. 726.
(6) Lindley, John. Flora Medica, 1838, p. 508.
(7) Squire, P. W. Companion to the British Pharmacopoeia, 1916, p. 749.
(8) Coste, H. Flore do la France, ii., 1903, p. 618.
(9) Bonnier, Gaston. Flore complète de France, Suisse et Belgique, viii., p. 28, Pl. 433.
(10) Bentham, George. The British Flora, ii., 1865, p. 592.
(11) Engler u. Prantl. Die natürlichen Pflanzenfamilien, 1st Edn, iv. Teil, About 3b, 1895, pp. 17, 18.

NELSHABY SEED WHEAT COMPETITION, 1935.

[Judged by E. L. ORCHARD, District Agricultural Instructor.]

The conduct of this worthwhile Competition annually among members of the Nelshaby Branch of the Agricultural Bureau resulted in a total of 10 samples being submitted for inspection in the 1935 contest.

Quantities of 2lbs. of each variety entered were drawn from a five-bag lot in the barn of the entrant, and after being sealed and numbered, were taken charge of by the Hon. Secretary (Mr. A. M. Lawrie) and handed over for judging to the following scale of points:—

(*a*) Weight per bushel	25 points
(*b*) Plumpness and evenness of grains	15 "
(*c*) Freedom from visible admixture	15 "
(*d*) Freedom from bunt, weed seeds, &c.	20 "
(*e*) Freedom from injury in harvesting	15 "
(*f*) Freedom from dirt, chaff straw, &c.	10 "
Total	100 points

Trophies were offered for the best collection of two distinct varieties, and to the single sample obtaining the greatest total of points of all the exhibits.

1. *E. T. Franks*: Quality and Nabawa.—Both samples presented a fair weight per bushel, Nabawa being a little the lighter of the two, with Quality a shade inferior as to plumpness and evenness. Unfortunately a suspicion of barley in Quality, and a

greater aggregation of the same weed in Nabawa, brought the points down considerably. A sprinkling of damaged kernels in Quality, contrasted with the slightly increased number in Nabawa, the same proportion applying in the matter of chaff over the two varieties.

2. *F. Jose*: Quality and Nabawa.—Somewhat of a contrast regarding the weight per bushel, both samples were identical in their freedom from bunt, weed seeds, &c., and the varietal variations of the grains appeared to approximate the same in each instance. Harvesting injury was more pronounced in Nabawa, the same variety containing an appreciably larger amount of cocky chaff.

3. *L. C. Roberts*: Nabawa and Currawa.—Both varieties were rather pleasing in general uniformity, the weight per bushel giving a good lead in that direction, with the other deciding factors maintained to the same degree practically throughout. In comparison with other entries it will be noted in this exhibit that Nabawa holds pride of place against Currawa, which fell away slightly in the regularity of the grains, and in the retention of a little more chaff.

4. *H. Williams*: Nabawa.—An entrant in the one variety class only, its weight per bushel was a trifle below that of the average of the four exhibits of Nabawa submitted. Clean and free from bunt, weed seeds, &c., green grains had intruded, and a variation in the plumpness and evenness was confirmed under the glass. In common with many samples of Nabawa from the 1934 reapings, a percentage of injured grains was apparent, in spite of the fact that a number of glumes had been retained.

5. *L. C. Roberts*: Sword and Quality.—Productive of a fair weight per bushel in the individual exhibits, the plumpness and evenness of Sword was observed in a rather "shotty" sample of the variety. Green grains came under notice in both lots, whilst an excess of barley seeds in Quality reduced its value from a seed wheat point of view. Both contained a little chaff, that in Sword being the greater, cracked grains showing up more in Sword also.

6. *E. H. Hampel*, Terka (grower), entered by L. C. Roberts: Ranee 4H.—This entry grown at Terka, on the eastern foothills of the Flinders Range, and therefore not eligible for competition under the rules, was made with the idea of comparing the sample with those produced in the Nelshaby district. The heaviest of any of the entries, its weight per bushel gave it a commanding lead, which was ably supported by an absence of bunt or weed seeds, whilst its uniformity, type, and comparative freedom from chaff ultimately placed it at the top of the exhibits tabled.

No.	Name.	Variety.	a. 25	b. 15	c. 14	d. 20	e. 15	f. 10	Total Class II. 100	Total Class I. 200
1	E. T. Franks	Quality .	24	12·5	13	19	13	9	90·5	178·25
		Nabawa .	23·25	13	14	17	12·5	8	87·75	
2	F. Jose	Quality .	24·25	13	14	20	13·5	9	93·75	181·00
		Nabawa .	20·75	13	14	20	12	7·5	87·25	
3	L. C. Roberts	Nabawa .	22	13·5	14	19	13·5	9	91	181·5
		Currawa .	23	13	14	19	13·5	8	90·5	
4	H. Williams	Nabawa .	21·25	12·5	13	20	12	8·5	87·25	—
5	C. Roberts	Sword ...	22	14	14	19	12	8·5	89·5	175·0
		Quality .	23·5	13	13	14	13	9	85·5	
6	L. C. Ro...	Ranee 4H	25	14	14	20	13	9	95	—

The winning entry in Clas... is therefore No. 3, consisting of Nabawa and Currawa, made by Mr. L. C. Roberts, wit... uality and Nabawa of No. 2 entered by Mr. F. Jose filling a very close second positi... Quality in this exhibit also secures for Mr. Jose the trophy in Class II. which goes to ... single variety scoring the highest total of points.

APPLE INDUSTRY.

[The Australian Agricultural Council has received the appended comprehensive report on the economic and scientific problems of the apple industry from the Council for Scientific and Industrial Research.]

Investigations into the various types of disorders which affect different varieties of apples in storage are being conducted in Tasmania by Mr. W. M. Carne, of the Division of Plant Industry working in co-operation with the Tasmanian Department of Agriculture and the University of Tasmania. These disorders, which are of a very complex nature, are being determined and classified. Definite information is being obtained regarding the conditions under which they are developed, and methods of control are being studied. The investigations are of importance not only with respect to the apple industry, but also in connection with the elimination of unprofitable or undesirable varieties of apples.

Studies of the effects of seasonal climate on the quality and storage capacity of apples are being conducted in conjunction with those on maturity, size of crop, &c., and whilst the effects are obviously difficult to determine, in some cases definite correlations have been found. For example, severe water-core accompanies heat waves in the fruit-growing season, and crinkle follows if the hot conditions are severe and prolonged. If the heat wave occurs during or just prior to picking so that when picked the fruit has water-core, it will develop breakdown in storage.

Bearing Problems.

Investigations are also being conducted into the problem of alternate light and heavy bearing of apple trees. Except in a few instances, neither manurial, pruning, nor fruit thinning practices have given any satisfactory results with respect to this problem, either in Australia or elsewhere. In the hope that the investigation into the process of fruit bud formation might indicate a point of attack on this problem, the Council's Division of Plant Industry has, in co-operation with the Victorian and South Australian Departments of Agriculture, made studies of the process of fruit bud formation, and the relation of this process to the growth of the tree in apple varieties of both biennial and annual cropping habits. The information thus obtained, whilst increasing our knowledge of the mechanism of the process, emphasises the difficulty of controlling the biennial cropping habit by means of cultural operations performed subsequent to blossom time.

Two lines of further investigation are indicated:—

(i.) The development of a commercial method whereby the heavy blossom of the "on" year may be reduced to an amount sufficient to set a moderate crop.

(ii.) The discovery of strains of varieties, in which the feature alternation is not so pronounced (*vide* citrus). A search of established orchards may result in the discovery of strains possessing the quality of [illegible]en cropping.

Stanthorpe Stocks.

In co-operation with the Committee of Direction of F[illegible] Marketing of Queensland and the Department of Agriculture, an inves[illegible]ion has recently been commenced at Stanthorpe into the question of t[illegible]ype of stock most suited to the requirements of that district. Certain E[illegible] Malling Stocks are being used and compared with other stocks, such as [illegible]thern Spy and seedling stocks, but it will be some years before results a[illegible]ely to be available.

COLD STORE WASTAGE.

The different types of wastage occurring in Jonathan apples in cold storage and the conditions giving rise to them are being studied intensively in co-operation with the Victorian Department of Agriculture at the Government Cool Stores, Melbourne. The object of the investigations is to determine the effect of maturity, *locality, and tree individuality* on the keeping qualities of the apple. Satisfactory progress has been made in the work, and it is anticipated that before long it will be possible as a result of the investigations to make definite recommendations regarding Jonathan apples for export, particularly in regard to the degree of maturity at picking.

APPLE CASES.

The Council's Division of Forest Products in co-operation with the Standards Association of Australia has conducted an extensive series of experiments into the most suitable type of cases for apple exports. The evidence which was obtained showed that different types of cases were used in the apple export trade and that serious inconvenience in production, packing, and stowing and adverse comment in marketing resulted. The first step was, therefore, the elimination of a number of undesirable types of cases following on action which had already been taken in this direction by the Apple and Pear Export Council.

Under the Commerce Regulations, two types of cases are now permitted, viz., the Canadian and the dump. The regulations are, however, of a broad nature regarding variations in capacity, and in addition make no provision for the sizes of the individual parts of the case. Commercial cases are accordingly at present far from being standardised.

The results of the experiment showed that a case of the dump shape, enlarged from the statutory 8⅝in. width to 9in. in order to accommodate the minimum weight of fruit required by overseas buyers gave the best protection to its contents. An experimental shipment of 540 cases was made by the Council in 1934, but the results were inconclusive. Apparently any difference in respect to liability to bruising which might have existed between the two types of case was hidden by undermined causes of bruising more important than the type of case.

The C.S. & I.R. and the Special Committee on Fruit Cases appointed by the Standards Association of Australia have undertaken sufficiently detailed tests and export trials to show that the question of standardisation of the apple case is influenced at present by factors other than the protective value of the cases. It appears that the industry should make the next decision as to how largely bruising affects the sales value of apple consignments. It should then take the necessary steps to choose a standard which will give the requisite degree of protection and at the same time fulfil the majority of the marketing requirements.

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LAKE ALBERT AND JERVOIS HERD TESTING ASSOCIATION (formerly Lake Albert).

RESULTS OF BUTTERFAT TESTS FOR JUNE, 1935.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during June.	Per Cow during June.	Per Cow December to June.	Per Herd during June.	Per Cow during June.	Per Cow December to June.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
6/B ..	16	14·80	13,005	812·81	2,263·57	629·51	39·34	115·94	4·84
6/C ..	17	10	7,065	415·58	3,065·91	292·98	17·23	133·30	4·15
6/Y ..	13	8·23	2,127½	164·42	2,720·81	89·05	6·85	114·70	4·17
6/FF .	27·17	17·97	9,000	331·25	4,167·28	353·48	13·01	174·62	3·93
6/II ..	7·30	6·60	4,537½	621·57	4,700·84	187·32	25·66	195·45	4·13
6/KK	19·70	14	6,780	344·16	3,192·99	260·85	13·24	122·67	3·85
6/LL .	23·53	14·77	4,947½	210·26	3,279·46	184·33	7·83	122·31	3·73
6/OO .	22·97	17·04	10,639	463·17	4,264·35	444·18	19·34	184·14	4·17
6/SS .	18·77	17·60	13,107	698·29	5,225·92	521·58	27·79	204·01	3·98
6/TT .	23·01	19·20	12,176½	529·17	4,505·88	523·67	22·76	189·85	4·30
6/VV	29·30	25·87	17,356	592·35	4,782·39	831·33	28·37	222·52	4·79
6/XX	27	21·63	12,185	451·30	4,595·14	494·66	18·32	187·43	4·06
6/CCC	24·53	14·97	6,893½	281·02	2,877·47	300·14	12·24	127·13	4·35
6/DDD	25·93	19·43	10,079	388·63	3,546·65	438·82	16·92	156·92	4·35
6/JJJ	22·97	21·03	16,224½	706·33	4,511·41	784·30	34·14	214·10	4·83
6/NNN	35·93	29·27	15,974	444·59	3,865·77	721·59	20·08	170·88	4·52
6/MMM	7	7	4,695	670·71	4,817·37	212·85	30·41	215·34	4·53
6/OOO	21·20	19	15,909	750·42	1,471·95	691·63	32·62	61·53	4·35
6/QQQ	15	9	8,250	550·00	—	311·61	20·77	—	3·78
6/PPP	15	15	16,020	1,068·00	—	667·65	44·51	—	4·17
Means	20·62	16·12	10,349·06	502·00	3,950·18	447·08	21·69	169·62	4·32

THE HILLS HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR JUNE, 1935.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during June.	Per Cow during June.	Per Cow July to June.	Per Herd during June.	Per Cow during June.	Per Cow July to June.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
7/H .	10·67	10·67	5,767	540·48	6,159·13	278·17	26·07	294·85	4·82
7/L ..	32	26·47	14,403	450·09	5,860·27	626·24	19·57	259·73	4·35
7/P ..	28·03	19·80	13,789½	491·95	6,664·11	642·73	22·93	317·95	4·66
7/AA .	25	9·57	5,347	213·88	5,045·89	221·97	8·88	229·31	4·16
7/TT .	16·53	13·93	10,296½	622·89	7,630·80	433·28	26·21	331·97	4·21
7/XX	21	17·83	10,965	522·95	6,904·47	563·90	26·92	369·30	5·20
7/BBB	78·73	63·57	36,885½	468·64	5.922·64	1,730·28	21·98	264·46	4·69
7/CCC	25	18·40	9,075	363·00	5,572·44	414·84	16·59	239·29	4·57
7/DDD	12·20	8·83	6,098	499·83	6,609·00	288·02	23·61	316·19	4·72
7/EEE	11·30	10·97	6,964	616·28	6,589·02	359·06	31·77	331·47	5·16
7/GGG	14·13	9·87	5,011	354·63	4,024·56	225·10	15·93	183·08	4·49
7/HHH	12	6·30	3,818½	318·21	6,262·61	131·36	10·95	219·14	3·44
7/II .	15·77	10·20	6,122½	388·15	6,932·45	226·89	14·39	242·23	3·77
7/KKK	24·73	17·80	8,727½	352·81	5,201·43	454·04	18·30	262·06	5·11
7/LLL	17	10·93	8,298	488·12	6,463·33	390·63	22·98	340·18	[illegible]
7/MMM	12·30	11·33	5,345	434·55	5,364·21	301·72	[illegible]	281·69	5·64
7/NNN	12	10·97	6,819½	569·83	1,029·60	[illegible]	23·39	40·94	4·09
Means	21·67	16·32	9,631·32	444·45	5,784·10	445·18	20·54	265·81	4·62

SOUTHERN DISTRICTS HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR JUNE, 1935.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk. Per Herd during June.	Milk. Per Cow during June.	Milk. Per Cow March to June.	Butterfat. Per Herd during June.	Butterfat. Per Cow during June.	Butterfat. Per Cow March to June.	Average Test.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
9/A ..	29·07	21·47	10,683½	367·51	1,359·65	567·97	19·54	69·34	5·32
9/C ..	13·83	9·30	5,225	377·80	1,644·90	210·95	15·25	68·22	4·04
9/D ..	30·30	25·20	10,501	346·56	1,851·39	577·92	19·07	99·87	5·50
9/E ..	12	8·80	4,242	353·50	1,777·62	207·68	17·31	86·81	4·90
9/F ..	17	10·77	6,565	386·18	1,381·20	266·13	15·65	62·62	4·05
9/G ..	27·87	19·33	9,732½	349·21	1,773·67	519·93	18·66	92·13	5·34
9/I ..	29·57	16·53	9,885	334·29	1,160·16	400·83	13·56	51·04	4·06
9/J ...	21	13·40	7,431	353·86	1,169·41	320·37	15·26	49·62	4·31
9/L ..	30	19·50	11,545	384·83	1,207·57	431·68	14·39	47·88	3·74
9/O ..	24·27	18·20	9,417	388·00	1,571·12	459·30	18·92	73·28	4·88
9/P ..	45·50	35·30	23,144	508·65	1,134·15	1,145·03	25·17	57·54	4·95
9/T ..	16·27	11·27	6,183½	380·05	1,211·56	277·20	17·04	54·77	4·48
9/W .	28·97	26·20	17,842	615·87	2,172·20	820·80	28·33	93·34	4·60
9/X .	8·07	5·02	3,228	400·00	1,423·06	169·51	21·00	72·77	5·25
9/Y ..	11	8	4,755	432·27	1,542·01	193·91	17·63	62·03	4·08
9/Z ..	11·53	10·23	3,616	313·61	1,153·34	180·86	15·68	56·54	5·02
9/AA .	16	15	6,905	431·56	1,584·52	421·10	26·32	90·32	6·10
9/BB	24·43	17·33	7,953	325·54	963·78	410·05	16·78	49·93	5·16
9/CC .	18·43	17·30	13,039½	707·51	1,622·54	658·11	35·71	84·64	5·05
9/FF .	19	5·30	3,626½	190·87	211·91	138·05	7·27	8·01	3·81
9/EE .	42·63	28·70	11,056½	259·33	675·47	606·29	14·22	35·58	5·48
9/DD	17	13·57	3,506	206·24	656·21	197·98	11·65	33·85	5·65
Means	22·44	16·17	8,640·09	384·98	1,369·48	417·35	18·60	66·94	4·83

NARRUNG HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR JUNE, 1935.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk. Per Herd during June.	Milk. Per Cow during June.	Milk. Per Cow October to June.	Butterfat. Per Herd during June.	Butterfat. Per Cow during June.	Butterfat. Per Cow October to June.	Average Test.
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
5 C ..	30	25·20	19,628	654·27	4,220·87	1,046·74	34·89	220·01	5·33
5/D ..	33·60	25·50	16,749	498·63	3,877·36	886·15	26·38	208·81	5·27
5/E ..	35·97	22·47	13,917	386·80	4,152·45	761·17	21·15	215·26	5·47
5/R ..	67·70	48·50	37,944½	560·48	3,611·19	1,688·94	24·95	161·89	4·45
5 EE .	22	3·60	1,123½	51·07	3,805·99	63·82	2·90	194·85	5·68
5/Z ..	29	28·10	25,950	894·83	6.444·11	1,369·50	47·22	328·96	5·28
5/WW	20	14·93	11,425½	571·28	3,840·30	519·76	25·98	181·15	4·55
5/XX	20·80	16·60	10,467	503·22	3,701·03	525·92	25·28	194·77	5·02
5/YY	12	8	4,725	393·75	3,484·66	234·40	19·53	175·51	4·96
5/AAA	18	11·83	9,068	503·78	3,899·95	443·83	24·66	194·13	4·89
5/BBB	17·01	5·77	2,887½	169·75	2,847·42	152·58	8·97	143·09	5·28
5/DDD	28	22·17	18,033	644·03	6,892·78	757·42	27·05	284·84	4·20
5/EEE	23·97	20·47	14,006	584·31	5,568·90	617·33	25·75	250·10	4·41
5/FFF	9			All cows dry.					
5/GGG	9	8·63	3,110	345·56	3,986·99	152·13	16·90	187·57	4·89
5/HHH	19	13·57	6,980½	367·39	5.087·65	298·51	15·71	205·16	4·28
5/III	18	14·73	4,830½	268·36	1,298·35	272·23	15·12	76·44	5·64
5/JJJ	26	24	18,675	718·26	2,154·84	973·12	37·43	110·44	5·21
5/KKK	15·30	15·30	7,050	460·78	1,486·79	324·64	21·22	67·55	4·60
5/AA .	21	18·90	8,773½	417·78	1,167·28	420·84	20·04	53·16	4·80
Means	23·77	17·41	1,176·77	495·10	4,343·45	575·45	24·21	209·72	4·89

GOYDER'S LINE OF RAINFALL.

[*Paper written by the Director of Agriculture (Professor Perkins) in reply to a question submitted at the Ceduna Conference on 3rd July.*]

I have been asked to explain "Goyder's Line of Rainfall," and incredible though it may seem, this explanation must throw us back to a period not very far distant from the initial days of the settlement of the State. This settlement, as you know, took place towards the end of 1836: prior to that date the territory now known as South Australia was sparsely occupied by nomadic aboriginal tribes. In the circumstances it is to my mind remarkable that only 29 years later, *i.e.*, in 1865, it should have been possible to place on our maps a continuous line, which subsequently under the name of "Goyder's Line of Rainfall" played a conspicuous part in the history of the development of South Australia.

The memory of a community is proverbially short, and many may ask to-day "who was this Goyder, whose line continued to influence settlement many decades after his death?" According to "Johns' Biographical Dictionary of Australia," George Woodroofe Goyder was born in Liverpool, England, on the 24th of June, 1826; he was the son of Rev. D. G. Goyder, of New Jerusalem Church, London. He reached Australia in 1848, *i.e.*, 12 years after South Australia had been proclaimed a Province; he entered the Government Service in 1851, and occupied the position of Surveyor-General from 1860 to 1894; he led several exploration parties, and fixed and surveyed the site of Port Darwin, which he also laid out. He is said to have surveyed 700,000 acres of farming land in 1869-70. He died at Aldgate on the 2nd of November, 1898.

He appears to have been a man of exceptionally sound judgment and of untiring activity; indeed, in the latter connection he came to be known throughout the country as "little energy." Although in the course of a life-time he did much to facilitate the settlement of South Australia, his chief claim to fame will probably be that invisible Line, which has hitherto served to separate land upon which rural settlement was considered to be safe, on the one hand, from land upon which it was considered to be unsafe on the other. And curiously enough this was very far from having been the original object Goyder had in mind when he set out in 1865 to lay out the line with which his name became indissolubly connected.

In this connection let us hear what he had to say on the subject in his letter of the 6th day of December, 1865, addressed to the Secretary of Crown Lands, and submitted subsequently to the House of Assembly and ordered to be printed by that body on 12th December, 1865:—

SURVEYOR-GENERAL'S REPORT ON DEMARCATION OF NORTHERN RAINFALL.

Ordered by the House of Assembly to be printed, 12th December, 1865.

Surveyor-General's Office,
6th December, 1865.

Sir—I have the honour to report, for the information of the Honourable the Commissioner, that agreeably to instructions contained in your letter of the 3rd ultimo, I proceeded to make the necessary examination of the country lying to the north of Adelaide, to enable me to determine and lay down on the map, as nearly as practicable, the line of demarcation between that portion of the country where the rainfall has extended, and that where the drought prevails.

Had the drought, which unfortunately still prevails, been that of an ordinary nature, there had been no necessity for my leaving town upon this duty, as the line of demarcation might have been shown from information previously in my

possession, and specially referred to in my report on the valuation of some of the northern runs. The drought, however, being of an unusually severe nature, and extending more generally than any previously known, it became indispensable to add to my previous experience the knowledge of the state of the country as it now exists. To obtain this information, I adopted the following general route:—Passing in various directions over the intermediate country—viz., from Adelaide north-easterly to the Murray, northerly and north-westerly to Kooringa, north to Gottlieb's Wells,(1) east to Ketchoula,(2) northerly to Teetulpa,(3) southerly to east of Mount Lock,(4) north-west by Boniah Creek,(5) Rocky Gully,(6) and Hogshead(7) to Pekina, south-west and north-west through Booleroo to Mount Remarkable, north-easterly over plain to north of Kanyaka Run,(8) south-westerly by Western Plains to Port Augusta, and by Baroota and Telowie to Crystal Brook and Broughton, and thence by Clare to town.

The result of my investigation shows the line of demarcation extending considerably further south than I anticipated. The change from the country suffering from excessive drought to that where its effect has only been slightly experienced being palpable to the eye from the nature of the country itself, and may be described as bare ground, destitute of grass and herbage, the surface soil dried by the intense heat, in places broken and pulverised by the passage of stock, and formed by the action of the wind into miniature hummocks, surrounding the closely cropped stumps of salt, blue, and other dwarf bushes, whilst those of greater elevation are denuded of their leaves and smaller branches as far as the stock can reach. This description generally holds good of all country upon which stock has been depastured and where the drought obtains. The change from that to where the drought has had a less serious effect being shown by the fresher and more leafy appearance of the bushes, gradually improving to those in their ordinary state, and the gradual increase of other vegetation from bare ground to well-grassed country.

During my visit I observed that places upon stocked runs pretty well grassed during the drought of 1859 are now utterly destitute of grass or herbage.

The line of demarcation I found to extend from Swan Reach, on the River Murray, in a south-north-westerly direction to the Burra Hill,(9) and thence north to Oak Rises, east of Ulooloo,(10) and by the last-named hill to Mount Sly; and in a northerly and westerly direction as shown by plan herewith forwarded, by the Hogshead and Tarcowie, to Mount Remarkable; thence southerly by the Bluff and Ferguson's Range to the Broughton; and south-westerly to the east shore of Spencer's Gulf, crossing the Gulf to Franklin Harbour; and thence north-westerly to the west end of the Gawler Ranges.

Should the Commissioner wish for any further information on this subject, or desire suggestions as to the mode of meeting the distress caused by this sad visitation, which my knowledge of the subject and experience may enable me to offer, I shall be happy to supply such additional information as may be required.

I have, &c.,

(Signed) G. W. Goyder, Surveyor-General.

To the Secretary of Crown Lands.

(1) Gottleib's Wells changed to Parnggi Wells: 2 miles South-west of Terowie.
(2) Ketchoula: 19 miles South-east of Terowie.
(3) Teetulpa: Goldfield 22 miles North-east of Yunta on Cockburn Railway line.
(4) Mount Lock: 11½ miles South-west of Yongala.
(5) Boniah Creek: 5 miles North-west of Yongala.
(6) Rocky Gully: Between Boniah Creek and Hogshead.
(7) Hogshead: 5 miles North of Tarcowie.
(8) Kanyaka Run: 3½ miles North-west of Gordon and 14 miles South-west of Hawker.
(9) Burra Hills: 10 miles South-east of Kooringa.
(10) Ulooloo: 9 miles south of Yarcowie.

It will be seen from this letter that Goyder's immediate object was to separate pastoral areas that had suffered from the effects of drought from those that had not so suffered: at the time cultivation does not appear to have extended much beyond Clare, and recognised farming areas were therefore well within good rainfall conditions; and it is only in later times that "Goyder's Line" came to be looked upon as the boundary beyond which cultivation should not extend.

In order to stress economic and climatic conditions of 1864-65 and 1865-66 in contrast with those more familiar to us, I have summarised a few data in Table I.

TABLE I.—*Comparative Statistical Data.*

	Means of 1864-65 and 1865-66.		1933-34.	
	Total.	*Per Head.*	*Total.*	*Per Head.*
Population .... Nos.	157,426	—	583,538	—
Under Cultivation .... *Acres*	*624,172*	*3·96*	*7,852,369*	*13·46*
Under Wheat .... Acres	400,722	2·55	3,821,795	6·55
Wheat Production .... *Bush.*	*3,920,375*	*24·90*	*35,373,466*	*60·62*
Mean Yield per Acre .... Bush.	9·78	—	9·26	—
Mean price per bushel .... s. d.	7 6	—	2 7½	—
Mean April-November Rain .... Ins.	15·91	—	11·58	—
Bare Fallow .... Acres	102,407	0·65	2,545,324	4·36
Horses .... Nos.	68,446	0·43	196,789	0·34
Cattle .... Nos.	181,475	1·15	352,728	0·60
Sheep .... Nos.	3,942,769	25·05	7,941,960	13·61
Pigs .... Nos.	54,586	0·35	91,573	0·16
Government Revenue..........£	932,484	5 18 6	10,187,986	17 9 10
Government Expenditure ....£	663,596	4 4 4	12,712,166	21 16 7
Public Debt ....£	817,750	5 3 11	106,682,092	182 17 10
Railways Open .... Miles	68	—	2,530	—
Main Roads .... Miles	276	—	—	—
Wool exports .... Lbs.	16,180,993	100·45	58,539,161	100·33
Wool exports (Value) ....*£*	*798,569*	*5 1 5*	*3,799,000*	*6 10 2*
Wheat exports .... Bush.	1,282,424	8·15	—	—
Wheat exports (Value) ....*£*	*487,905*	*3 2 0*	*3,038,240*	*52 1 4*

An examination of the above Table will show that, whilst relatively to the position of our predecessors of 1865 we certainly have made some progress, we appear to have fallen back in others. In the course of 70-odd years our population has nearly quadrupled at the mean rate of about 6,000 head per annum: more spectacular still has been the rise of our National Debt, namely from £817,750, and £5 3s. 11d. per head to £106,682,092, and £182 17s. 10d. per head: that is to say an increase of £105,864,382, or at a mean rate of more than one and a half million sterling per annum. True we have something to show for this huge debt: nearly 8 million acres in cultivation instead of about 650 thousand acres; two and a half million acres under Bare Fallow instead of one hundred thousand; thirty-five million bushels of Wheat instead of four million bushels, but 9.26 Bushels per acre only with superphosphate against 9.78 Bushels per acre without superphosphate; Government Revenue and Expenditure of ten and thirteen million sterling respectively against corresponding figures of nine and seven hundred thousand; two thousand five hundred miles of railroad against sixty-eight miles; and so on.

But our main concern is "Goyder's Line" to which facts such as these must serve as a background. It must, however, be clear that the causal factor behind the line was what was considered at the time as two successive years of unparalleled drought in the pastoral country. The following extracts from authoritative sources will serve to show what was thought of the drought in those days.

In December, 1864, long drought and hot winds were said to have seriously affected Wheat crops at Kapunda and at Port Elliot: whilst at Clarendon the Wheat crops completely failed. On Yorke Peninsula there was no rain for five months with resulting scarcity of water, which was selling at 6s. per hogshead (probably 50galls).

Sir Charles Todd, for many years Government Meteorologist, classed 1865 as a great drought year in Australia: and added that in South Australia the effects of two successive years of drought had been disastrous.

In 1866 droughty conditions continued, with the result that there was a great scarcity of feed, leading to loss from starvation of much livestock among which even draught horses were included. It was said that scarcely any rain had fallen in Northern Areas since 1864.

Nevertheless, data in Table I. show that for the two seasons the mean April-November rainfall over the agricultural areas was 15.91in., and the mean yield per acre of Wheat 9.78bush. Those of us who can recall the 1914 drought with its mean average April-November rainfall of 6.77in. over over the agricultural areas and its mean Wheat yield per acre of 1.41bush. will probably wonder at the stress laid upon 1865 and 1866 droughts. It is obvious, however, that these droughts were in the main pastoral, and it is probable, too, that farmers had not at the time become accustomed to Australian climatic conditions to the extent that we have since become.

We are bound to recognise, however, that these droughty years did give us "Goyder's Line," and that it proved of considerable advantage to us in succeeding years of settlement.

This Line starts from the Victorian boundary about 4 miles South of Peebinga: proceeds in a North-westerly direction and cuts off a narrow triangle of the Southern portion of County Albert, about five-sixths of the area of which lies outside the Line. It enters County Eyre at Swan Reach, and proceeds steeply in a North-north-westerly direction towards Sutherlands in such a manner that one-half of County Eyre is inside and the other half outside Goyder's Line. It enters County Burra a mile or so from Robertstown, taking an almost northerly direction and leaving three-quarters of the County outside the Line. It then cuts off the South-west corner of County Kimberley, and runs in a North-westerly direction to the centre of County Dalhousie by way of Yatina. It then dips steeply in a South-south-westerly direction into County Frome to the level of Murraytown, but about 19 miles East of this town. The Line rises again equally steeply in a North-westerly direction, skirts the North foothills of Mount Remarkable, and falls steeply on a regular curve with South-easterly direction to the level of Crystal Brook, and thereafter with South-westerly direction and ending at Port Hughes.

On Eyre's Peninsula "Goyder's Line" starts opposite Port Hughes, and about 3 miles West of Point Gibbon. From the latter point the line extends almost without appreciable change of direction to the North-west, and ends in the Hundred of Hague, about 8 miles North-west of Nunjikompita. All land to the West of this point is deemed to be outside "Goyder's Line of Rainfall."

Such then is the Line as laid down by G. W. Goyder in 1865: I know that the Line is not absolutely perfect, and that when we have been blessed by a succession of favourable seasons there has been a tendency to overlook it, if not to criticise it unduly. It is true, too, that we have not hesitated, when the mood was on us, to go outside the Line, and attempt to farm out of bounds, and sometimes successfully. But has this always been the case? I believe not: in fact I am of the opinion that in the majority of cases it would have been wiser to leave such land to sheep and cattle: and I am further of the opinion that much of this country must eventually revert to Sheep and Cattle. It may be,

too, that when circumstances compel us to recognise the necessity of such reversion we shall find these lands to have improved from their brief experience of cultivation.

Before concluding, I wish to show briefly what farming success has been achieved of recent years in those areas situated outside Goyder's Line of Rainfall.

There are five Counties on Eyre Peninsula which are situated outside Goyder's Line of Rainfall, and in which Wheatgrowing has been more or less successfully attempted. The mean yields per acre of these Counties are shown below for the seven-year period closing in March, 1933:—

Means of 1926-33 Average Wheat Yields.

	Mean Areas.	Mean Yields.
	Acres.	Bushels per Acre.
Hopetoun	12,497	3·92
Kintore	32,210	3·80
Way	107,270	4·47
Buxton	132,050	4·94
York	1,803	3·18

I think that it can be stated very definitely that at no reasonably conceivable price for Wheat could such yields be looked upon as profit earning to the farmer or of particular value to the community. It follows therefore that during these seven years the excursion beyond the safety of Goyder's Line has proved definitely unsuccessful. But it will be said that this period of seven years included three seasons with relatively low April-November rains. Let us therefore consider more extensive periods, namely, the two ten-year periods closing in 1916 and 1926 respectively, and finally the means of the 27-year period closing in 1933.

Means of Twenty-seven Seasons.

Counties.	*1906-16.*		*1916-26.*		*1906-33.*	
	Mean Areas.	Mean Yields per Acre.	Mean Areas.	Mean Yields per Acre.	Mean Areas.	Mean Yields per Acre.
	Acres.	Bushels.	Acres.	Bushels.	Acres.	Bushels.
Hopetoun	11,872	6·43	10,778	7·41	11,628	6·07
Kintore	22,781	4·99	20,490	6·20	24,377	5·13
Way	78,709	5·42	73,998	6·63	84,295	5·21
Buxton	1,378	7·40	30,639	8·99	46,093	7·35
York	1,012	5·79	1,320	6·34	1,331	5·32

From the above it will be seen that the 27-year means are more favourable than the means of the latest seven-year period referred to previously. Nevertheless it must still be said that Counties Kintore, Way, and York with mean yields only slightly in excess of 5bush. cannot be looked upon as profitable Wheatgrowing propositions.

The balance of the areas sown to Wheat on Eyre's Peninsula outside Goyder's Line are to be found roughly in the northern halves of Counties Dufferin, LeHunte, and Jervois, respectively.

I shall give one example of the results before passing over to the mainland: for the purpose I shall take County Dufferin: data given below have reference to the four Hundreds that are substantially beyond Goyder's Line:—

Mean Wheat Yields for the Ten-year Period Ending in 1932.

Hundreds.	Mean Areas.	Mean Yields per Acre.
	Acres.	Bushels.
Hague	2,693	5·34
Nunnyah	1,898	6·90
Wallala	8,968	5·09
Koolgera	2,546	4·48
Mean of Four Hundreds	16,105	5·25

For that portion of County Dufferin which is situated outside Goyder's Line the mean yield of the past 10 years—5.25bush. per acre—does not appear to have justified the extension of farming beyond the Line: a possible exception might be the Hundred of Nunnyah with a mean yield of 6.90bush.

Before leaving Eyre's Peninsula it is as well to recall that for a variety of reasons vast areas brought under Wheat have not yet been adequately farmed: and it is certain that to an appreciable extent defective farming methods must be accepted as one of the factors responsible for undesirably low yields beyond the Line.

On the mainland there are eight Counties placed outside Goyder's Line in which Wheatgrowing has been carried on for many years: and if, including County Albert by far the greater proportion of which is outside the Line, the number would be raised to nine. Full data concerning these nine Counties are shown in tabular form on next page.

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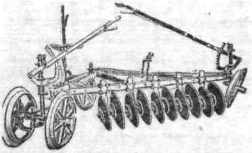

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TABLE II.—*Showing Mean Yields Per Acre of Wheat Grown in Nine Counties Outside Goyder's Line* (1906-1933).

	Units.	1906-16, 10 years.	1916-26, 10 years.	1926-33, 7 years.	1906-33, 27 years.
UPPER NORTH DIVISION.					
County *Hanson*—					
Mean area sown	Acres.	20,359	12,267	13,653	15,263
Mean yield per acre	Bush.	4·16	7·96	4·33	5·30
County Blatchford—					
Mean area sown	Acres.	8,363	5,875	8,102	7,370
Mean yield per acre	Bush.	4·73	8·51	5·74	6·13
County Newcastle—					
Mean area sown	Acres.	23,059	16,282	26,272	21,382
Mean yield per acre	Bush.	5·88	9·95	4·57	6·61
County Granville—					
Mean area sown	Acres.	15,059	5,031	6,224	9,075
Mean yield per acre	Bush.	4·22	9·05	3·90	5·16
County Herbert—					
Mean area sown	Acres.	8,322	4,328	4,168	5,766
Mean yield per acre	Bush.	6·33	9·15	4·89	6·84
LOWER NORTH DIVISION.					
County Kimberley—					
Mean area sown	Acres.	16,063	8,734	10,942	12,006
Mean yield per acre	Bush.	6·76	11·34	5·74	7·75
MURRAY MALLEE DIVISION.					
County Albert—					
Mean area sown	Acres.	69,541	113,801	229,811	127.452
Mean yield per acre	Bush.	6·61	7·08	4·82	5·93
County Alfred—					
Mean area sown	Acres.	50,748	143,972	273,096	142,921
Mean yield per acre	Bush.	8·41	9·51	6·15	7·69
County Young—					
Mean area sown	Acres.	5,594	6,622	13,835	8,037
Mean yield per acre	Bush.	5·20	6·33	4·74	5·34

On the mainland it cannot be said that Counties such as Hanson, Granville, and Young, the means yields per acre of which did not during 27 successive seasons exceed 5bush. by much, have justified themselves as Wheatgrowing Counties: it would probably be better for all concerned if they were allowed to revert wholly to sheep. Nor are the Counties Blackford, Newcastle, Herbert, and Albert, with mean averages over the same period varying from 5.93 to 6.84bush. per acre, very much better off. And it would seem that two only of the Counties outside Goyder's Line are worth retaining for Wheatgrowing purposes, namely:—

	1906-16, 10 years.	1916-26, 10 years.	1926-33, 7 years.	1906-33, 27 years.
	Bushels.	Bushels.	Bushels.	Bushels.
Kimberley	6·76	11·34	5·74	7·75
Alfred	8·41	7·51	6·15	7·69

And even in these two Counties Wheatgrowing alone is likely to prove a heavy struggle for those concerned.

It would seem to follow therefore that on the whole it would have been better for all if we had recognised in Goyder's Pastoral Line the limits beyond which Wheat could not be grown to economic advantage. But this could not have been: we had a vast territory open for settlement, and it was inevitable that we should test its possibilities to the utmost limits. The trouble is, however, that having discovered the limitations of this territory we are still exceedingly loath to recognise the latter in practical manner.

ENSILAGE COMPETITIONS.

HILLS DISTRICT.

[Judged by ROWLAND HILL, District Agricultural Instructor.]

Unfortunately the entries, comprising thirteen in number, were considerably below that of last year. Three of that number had not been opened for use when the time had expired, which left only ten actually judged.

However, the majority of those judged were very satisfactory, and should be a helpful advertisement in increasing the quantity made in these districts in the future.

The storing of fodder in the form of Silage is simple, economic, and the only means of conserving feed for livestock whereby succulency and valuable laxative qualities can be retained.

Repeated success by farmers who have taken reasonable care in the manufacture of silage should leave no doubt in the minds of those who have not attempted it, and the Department of Agriculture can at any time give advice where required.

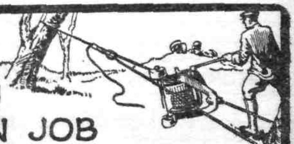
Special mention should be made of the excellent quality of the Silage in the three leading entries, and particularly that nominated by Mr. D. F. Sheppard, of Prospect Hill, who is a firm believer in the use of Silage for his dairy cows, which, in themselves are a splendid recommendation to other livestock owners who have not yet realised the value of Silage.

As can be seen from the analyses, the nutritive value of the fodder is very satisfactory, and in the majority of cases some of the inferior types of grasses and other material have been included in the mixture, which demonstrates how material, otherwise not appreciated by livestock, can be converted into a palatable and valuable fodder.

Although faults in curing could be found in many entries, the owners realised that they existed, and the trouble could be traced to circumstances which could not be avoided at the time.

Generally, the improvement in the quality of Silage was pleasing, and the increased popularity of it as a fodder was very evident.

GRUBBING



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Results of Competition.

Position.	Competitor.	Suitability of Plants. 15.	Succulency. 20.	Palatability. 15.	Nutritive Value. 35.	Percentage of Waste. 15.	Total. 100
1	D. F. Sheppard	13	19	14	33	13	92
2	J. M. Irwin............	14	19	14	30	12·5	89·5
3	R. G. Magor	14	18	14	29	13·5	88·5
4	R. J. Clements.........	12	18	14	26	14·5	84·5
4	H. F. Ouston	13	16	14	28	13·5	84·5
6	H. A. Woolley	14	18	12	27	13	84
7	A. E. Francis	13	18	13	27	12	83
8	F. P. Smith	12	14	12	29	13·5	80·5
9	M. J. Meyer	13	14	13	26	12	78
10	J. H. Dawkins	11	16	11	26	13	77

Analyses Standardised to 75 per cent. Moisture.

Position.	Competitor.	Moisture.	Fat.	Fibre.	Ash.	Protein.	Carbohydrates	Total.
		%	%	%	%	%	%	%
1	D. F. Sheppard ...	75	1·450	5·850	2·425	4·725	10·550	100
2	J. M. Irwin........	75	1·35	7·175	2·450	3·275	10·750	100
3	R. G. Magor	75	·82	7·430	2·075	3·575	11·100	100
4	R. J. Clements.....	75	·70	9·050	2·300	2·200	10·750	100
4	H. F. Ouston	75	·75	7·075	2·625	4·200	10·350	100
6	H. A. Woolley	75	·875	8·750	2·375	3·925	9·075	100
7	A. E. Francis	75	·75	9·025	1·900	3·150	10·175	100
8	F. P. Smith	75	·95	7·350	2·525	3·375	10·800	100
9	M. J. Meyer	75	·70	8·050	2·700	3·625	9·925	100
10	J. H. Dawkins	75	·475	8·950	2·050	2·275	11·250	100

JUDGE'S COMMENTS ON THE WINNING ENTRY OF Mr. D. F. SHEPPARD.

D. F. SHEPPARD (Prospect Hill).—A stack 12ft. by 12ft. which had been well weighted with stones. The material consisted of a high percentage of Subterranean Clover, mixed with Cape Weed, Soft Brome Grass, Sterile Brome Grass, Perennial Rye Grass, and Silver Grass. The stack was built in seven days, and contained exceptionally well-cured Silage, with only a small percentage of waste on the outsides. The condition of the livestock being fed from the stack was sufficient evidence of its palatability and nutritive value.

SOUTH-EASTERN DISTRICT.

CONDUCTED BY SOUTH AUSTRALIAN COMMITTEE OF AUSTRALIAN DAIRY COUNCIL.

[Judged by E. S. ALCOCK, District Agricultural Instructor.]

In the course of his report in the Competition, Mr. Alcock said most of the competitors had not had any previous experience in the manufacture of ensilage, but the success which attended their efforts was so encouraging that they propose continuing with this method of storing fodder. The entries were received from a wide area ranging from Coonawarra in the north, Bendlesham in the west and Kongorong in the south. The lack of confidence regarding success in the manufacture of ensilage is gradually disappearing, and there is no doubt that in the near future it will be a regular operation throughout the pasture areas. An example of the advantage of ensilage over grass hay was illustrated this year when several stacks of the former were

partially erected and heavy rain fell. No damage was done to the ensilage, but considerable trouble was experienced in drying the grass hay and it also lost quite a good deal of food value.

There was considerable variation in the moisture content and in order that a fair comparison could be made, all entries reduced to a common basis of 75 per cent. moisture.

In the following table the results after making this calculation and also ascertaining the starch equivalents and nutritive ratios are shown:—

Table Showing Particulars of Samples Reduced to 75 per cent. Moisture.

	Moisture.	Ash.	Protein.	Fat.	Fibre.	Carbo-Hydrates.	Total.	Starch Equivalent.	Nutrient Ratio.
	%	%	%	%	%	%	%	%	
A. P. Spehr	75	2·5	4·4	0·7	7·4	10·0	100	11·75	1 to 4·2
E. F. Gaffney	75	2·7	4·5	1·1	6·7	10·0	100	12·07	1 to 4·2
R. E. R. Lear	75	2·0	3·6	1·2	7·7	10·5	100	12·13	1 to 5·5
A. H. Allen	75	2·9	4·3	0·8	7·5	9·5	100	11·73	1 to 4·3
F. C. Caine	75	2·4	3·8	0·8	7·1	10·9	100	12·01	1 to 5·0
R. Smith	75	3·5	3·4	0·9	7·9	9·3	100	11·19	1 to 5·5
A. G. Stringer	75	2·6	2·4	0·7	8·0	11·3	100	11·44	1 to 8·4
F. A. Aslin	75	2·5	2·9	0·7	8·7	10·2	100	11·19	1 to 7·0
G. L. Dean	75	2·6	3·1	0·7	6·4	12·2	100	11·98	1 to 6·4
W. K. Chambers ...	75	2·7	2·7	0·8	8·9	9·9	100	10·50	1 to 7·4
Mrs. G. D. Stuc:ey	75	2·5	2·2	0·3	8·0	12·0	100	10·68	1 to 9·5

AWARDS.

The eleven entries were considered from the point of view of the suitability of the plants, succulence, palatability, and nutritive value of the material, together with the loss sustained in manufacture.

The points awarded under these headings and the relative position of each competitor are shown in the following table:—

Competitor.	Address.	Position.	Siutability. of Plants 15	Succulence. 20	Palatability. 15	Nutritive Value. 35	Percentage of Waste. 15	Total. 100
A. P. Spehr	O. B. Flat.......	1	14	[illegible]	13	33	14	90
E. L. Gaffney...	Coonawarra	[illegible]	13	15	13	34	14	89
R. E. R. Lear ..	[illegible]	3	12	15	14	33	14	88
[illegible]	Wandilo	3	12	19	13	32	12	88
F. C. Caine	Kongorong	5	14	13	14	33	13	87
R. Smith.......	Mount Gambier	6	10	19	14	31	12	86
A. G. Stringer ..	Mount Schank ..	7	13	13	12	30	12	80
F. A. Aslin	Mount Gambier	7	12	15	12	30	11	80
G. L. Dean	Kalangadoo	9	13	12	10	31	12	78
W. K. Chambers	Mil Lel	9	13	14	13	26	12	78
Mrs. G. D. Stuckey	Rendlesham	11	11	12	11	27	11	72

Commenting on the winning entry of Mr. A. P. Spehr, Mr. Alcock said this was stacked in a stone shed, 75ft. long, 15ft. wide, and about 20ft. high, and well weighted down with fencing posts, &c. An excellent exhibit with which a good deal of care was taken. The silage consisted of Perennial Rye Grass, Burr Clover, and Mount Schank Clover, making a good silage mixture. The green stuff was cut early in the season before it became too far advanced. The ensilage had an excellent aroma, and was readily eaten by stock. An odd load of material which had been left cut too long in the field was noticed. Waste was reduced to a minimum, and then only occurred alongside the wall.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA

RIVER MURRAY PRUNING COMPETITIONS.

The River Murray Pruning Competitions held this year were once again successful, and at each district—Mypolonga, Berri, Barmera, Moorook, Cadell, and Waikerie—special interest was shown, one pleasing feature being the number of junior competitors. In 1933 Mr. W. Langdon Parsons donated a silver cup for competition between districts, the ultimate winner to be the most consistent pruner over three years. The winner in 1933 was E. A. Liddicoat, Moorook, 548 points; 1934, H. M. Perkins, Berri, 539 points; 1935, C. Curtis, Waikerie, 549 points. The most consistent over the period was C. Curtis with 1,618 points, closely followed by H. M. Perkins, 1,615; A. Wedd, Mypolonga, 1,613; with E. A. Liddicoat and W. E. Rout, Berri, each 1,612.

The championship was held at Moorook and 15 competitors took part. Mr. J. B. Murdoch attended on behalf of the Advisory Board of Agriculture and the judging was done by Mr. E. Leishman (Horticultural Instructor) and Messrs. F. J. Elliott and R. N. Quinn (District Horticultural Instructor), Consultative Judges. The pruning was, as it should be, very good, only three points separating the top five competitors in the aggregate. The results were:—Vines—1st, H. M. Perkins, Berri, 283 points; 2nd, E. A. Liddicoat, Moorook, 282 points; 3rd, S. Loxton, Moorook, 281 points. Trees—1st, A. Wedd, Mypolonga, 266 points; 2nd, G. Elliott, Waikerie, W. H. Harris, Berri, 260 points.

The aggregate trophy, valued three guineas, was presented by the Dried Fruits Board, and the winner was W. H. Harris, of Berri, with 538 points. The other trophies were two cups donated by the Royal Agricultural and Horticultural Society for vines and trees respectively, and valuable manure trophies from Wallaroo-Mount Lyell Fertilisers and Adelaide Chemical and Fertiliser Company. The donors of these various trophies have been staunch supporters of the competitions, and the committee appreciates their valuable assistance, which has added to the interest of the pruning.

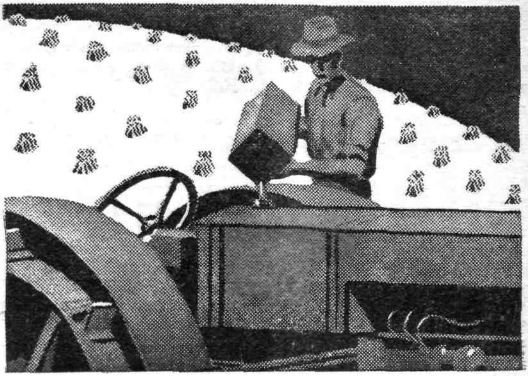
The following are the detailed figures of the Championship Competition:—

VINE SECTION.

Competitor. Branch.	Gordo.	Currant.	Sultana.	Total.
H. M. Perkins (Berri)	87	90	106	283
E. A. Liddicoat (Moorook)	87	90	105	282
S. Loxton (Moorook)	88	91	102	281
C. Curtis (Waikerie)	90	89	99	278
W. H. Harris (Berri)	87	86	105	278
G. Elliott (Waikerie)	87	85	103	275
R. Loxton (Moorook)	[illegible]	89	100	274
C. Kruger (Mypolonga)	85	[illegible]	102	272
W. E. Rout (Berri)	87	86	98	[illegible]
W. Perry (Waikerie)	87	87	96	270
A. E. Wedd (Mypolonga)	87	82	100	269
E. Prosser (Mypolonga)	83	87	95	265
W. Penny (Barmera)	86	83	95	264
A. E. Simpson (Barmera)	80	83	95	258
K. Shepherd (Barmera)	80	81	94	255

TREE SECTION.

Competitor. Branch.	Apricot.	Peach	Pear.	Total.
A. E. Wedd (Mypolonga)	90	89	87	266
W. H. Harris (Berri)	88	82	90	260
G. Elliott (Waikerie)	88	84	88	260
W. E. Rout (Berri)	87	86	85	258
A. C. Boehm (Waikerie)	84	85	89	258
S. Sanders (Moorook)	84	88	83	255
E. Prosser (Mypolonga)	86	87	82	255
E. A. Liddicoat (Moorook)	87	82	84	253
H. M. Perkins (Berri)	86	86	81	253
C. Kruger (Mypolonga)	82	87	84	253
C. Curtis (Waikerie)	82	84	86	252
F. Battams (Moorook)	83	85	83	251



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LANGDON PARSONS TROPHY.

Mr. J. J. Odgers, General Secretary of the Competition, announced the winner of the W. Langdon Parsons trophy as C. Curtis, of Waikerie. The winner gained 1,618 points, and was closely followed by H. M. Perkins 1,615, A. E. Wedd 1,613, E. A. Liddicoat 1,612, G. Elliott 1,608, W. Perry 1,596, C. Boehm 1,584.

NEXT CHAMPIONSHIP AT MYPOLONGA.

It was unanimously decided to recommend to Conference that the next Championship meeting be held at Mypolonga. It was stated that the championships had never been held in that centre, but that pruners from there had been coming to Upper Murray Competitions for many years.

LOWER NORTH.

The Championship of the Lower North Pruning Competitions was held at Williamstown on July 17th. Orchards and vineyards were kindly placed at the disposal of the committee by Messrs. W. C. Smith, A. J. Mitchell, G. L. Leditschke, and C. Fromm. Results:—

VINE SECTION.

Judges—Messrs. J. L. Williams (Viticultural Instructor, Roseworthy Agricultural College), and E. Leishman (District Horticultural Instructor).

Abbreviations.—Branches: (Li. Ps.), Light's Pass; (Lo.Pi.), Lone Pine; (W.), Watervale; (Wms.), Williamstown; (LD.), Lyndoch; (K.), Koonunga; (P.), Penwortham; (G.), Greenock.

Competitor.	Bush Vines. Spur-Pruned. 100	Trellis Vines. Rod and Spur-Pruned. 100	Total. 200
A. T. Leske (Wms.)	93	97	190
H. Linton (Li. Ps.)	93½	95	188½
H. Parbs (Lo. Pi.)	94½	93	187½
G. Merritt (W.)	96	91	187
P. Obst (G.)	94	93	187
F. Linton (LD.)	90½	95½	186
F. L. Chapman (Wms.)	93	92	185
A. Hentschke (Lo. Pi.)	91	91½	182½
H. Falkenberg (K.)	90½	92	182½
A. Obst (G.)	93	88½	181½
H. O. Helbig (G.)	90½	90	180½
R. Schulz (K.)	86½	93½	180
A. Linton (LD.)	89	89½	178½
W. Ahrens (Li. Ps.)	88	90	178
R. Gallasch (K.)	88½	88	176½
W. O. Baker (W.)	91½	84	175½
H. Kappler (Lo. Pi.)	90½	83	173½
W. B. Koop (Li. Ps.)	87	83½	170½
B. O. Sachse (W.)	88	81	169
F. Nayda (P.)	85½	81	166½
C. S. Wyman (P.)	85½	80	165½
H. Obst (Wms.)	80½	84½	165
R. Dahlitz (LD.)	80½	80½	161
F. Ward (P.)	82	78	160

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TREE SECTION.

Judge—H. H. Orchard (District Horticultural Instructor).

Competitor.	Prune. M. 100.	Pear. M. 100.	Peach. M. 100.	Apricot. M. 100.	Total. M. 400.
F. Boehm (Li. Ps.)	95½	90½	94½	88½	369
C. A. Hoffman (Lo. Pi.)	93½	91	92	90	366½
J. B. Helbig (G.)	94½	90	92	90	366½
C. F. Wilksch (G.)	91	87½	95	91	364½
V. M. Duke (P.)	93	89	89½	93	364½
A. Smith (W.)	90	90	92	91½	363½
E. G. Helbig (G.)	91	89½	89½	91	361
H. Linton (Li. Ps.)	91½	88	91	90	360½
G. Boehm (Li. Ps.)	87½	92	87½	92½	359½
H. D. Bain (Wms.)	89	91	90½	88½	359
A. T. Leske (Wms.)	91½	89	88	90½	359
A. Andriske (Lo. Pi.)	90½	87	91	90	358½
H. Kappler (Lo. Pi.)	94	87	86½	90½	358
J. Alcock (Pi)	89½	88½	88	91½	357½
W. O. Baker (W.)	87	88	91½	90½	357
W. H. Penna (P.)	87½	89½	89½	89	355½
D. J. Bain (Wms.)	78	89½	91½	94	353
E. W. Burgess (W.)	90½	87½	77½	90½	346

THE W. LANGDON PARSON'S TROPHY.

Two Years' Aggregate Figures.

In six sections each year; maximum 1,200 points, from local Competition results. Competitors who have gained more than 1,000 points:—

G. Boehm	1,087	W. Koop	1,051
J. B. Helbig	1,082	W. Ahrens	1,050
C. A. Hoffman	1,082	W. O. Baker	1,047
E. G. Helbig	1,079	A. S. Burgess	1,043
H. Linton	1,076	A. Smith	1,036½
C. F. Wilksch	1,070½	K. Boehm	1,036
A. Andriske	1,065½	A. B. Fromm	1,032
F. Boehm	1,064	E. Kruger	1,031½
A. Kappler	1,061	O. T. Burford	1,025
A. T. Leske	1,058½	E. W. Burgess	1,023½
E. Boehm	1,054	D. Boehm	1,018½
S. M. Turnbull	1,053	R. H. Burgess	1,004½

STATE OF SOUTH AUSTRALIA.

SUMMARY OF LIVESTOCK STATISTICS, YEAR 1934.

[A. W. BOWDEN, Acting Government Statist.]

I. SHEEP AND WOOL.

1. *Number of Sheep.*—The sheep flocks on 31st December, 1934, numbered 7,884,919, a decrease of 56,141 on the record of 7,941,060 in 1933. The flocks were classified as follows:—Ewes, 4,199,530 (4,073,611); wethers, 2,091,575 (2,079,515); rams, 104,437 (100,169); under 1 year old, 1,489,377 (1,687,765).

2. *Breeds of Sheep* were reported by owners as follows:—Merino, 6,792,155; Corriedale, 76,303; Dorset Horn, 7,201, Leicester Border, 3,554; Leicester English, 1,225; Lincoln, 1,288; Polwarth, 1,639; Ryeland, 1,109; Romney Marsh, 3,388; Shropshire, 3,341; Southdown, 2,202; Suffolk, 3,069; pure breeds (not stated), 844; Merino Comeback, 436,498; all other (including Crossbred), 501,103; total, 7,884,919.

3. *Lambing,* 1934.—During 1934 3,408,561 (3,304,532) ewes were mated and 1,875,296 (2,051,130) lambs marked; percentage, 55.02 (62.07).

4. *Winter Lambing, 1935.*—3,520,000 ewes were reported as either mated or intended to be mated for the winter lambing of 1935. In addition 140,000 ewes were expected to be reserved for spring lambing. Details for the 1935 winter lambing are being obtained, and will be published later.

5. *Wool Clip.*—8,131,202 (8,111,296) sheep and lambs were shorn; the total clip, including locks, bellies, pieces, &c., being 68,547,294lbs. (67,668,282lbs.), increase 879,012lbs., which is the highest clip on record. The average fleece for sheep and lambs combined was 8.43lbs. (8.34lbs.), and for sheep only 9.66lbs. (9.81lbs.).

6. *Total Wool Production.*—Subject to slight revision, it is estimated that the grand total wool production, including the clip and wool fellmongered and wool on local skins exported, was 77,500,000lbs. (79,288,903lbs.); increase, 1,788,903lbs.; value, £2,650,000 (£4,506,253); decrease, £1,856,253, the average value per lb. greasy being 8.19d. (13,64d.).

II. Cattle.

1. *Numbers.*—All kinds, 346,479 (352,728); decrease, 6,249. Dairying cattle, 170,250 (163,875); increase, 6,375, classified as follows:—In milk, 113,811 (110,551); dry, 40,198 (36,930); and heifers springing, 16,241 (16,394). In addition there were 22,878 (22,211) other heifers 1 year and over which are possible additions to the dairying herds. The dairy cattle number exceeded the record of the previous year.

2. *Butter and Cheese.*—Provisional 1934-35 butter, 18,250,000lbs. (19,755,695lbs.), and cheese, 6,700,000lbs. (5,316,971lbs.). Oversea exports were:—Butter, 6,299,175lbs. (8,308,420lbs.); cheese, 2,359,107lbs. (667,172lbs.). Cheese production exceeded the previous record by approximately 600,000lbs., and the oversea exports by nearly 800,000lbs.

III. Horses.

Horses, 198,765 (196,789); increase, 1,976, being highest since 1928.

IV. Pigs.

Pigs, 86,297 (91,573); decrease, 5,276.

V. Goyder's Line of Rainfall and Livestock.

During the year 1934 the percentage to the total of sheep outside Goyder's Line of Rainfall decreased from 34.30 to 32.65, cattle 29.30 to 27.63, and horses 27.59 to 26.95. The numbers within and without the line for 1934 were:—Sheep, 5,310,764 and 2,574,155; cattle, 250,738 and 95,741; horses, 145,199 and 53,566.

VI.—Interstate Movement of Stock.

The State gained 28,573 head of cattle, 81,303 sheep, and 433 horses by transit of stock between States. The total imports were:—Sheep 211,785, cattle 40,639, horses, 1,804; and exports—Sheep 130,482, cattle 12,066, horses 1,371. Net exports of horses to oversea countries, 254.

VII. Slaughtering.

Sheep and lambs, 1,591,054 (1,495,127); cattle, 140,170 (104,488); pigs, 150,575 (167,526). Oversea exports, 1934-35, were:—273,680 (206,144) carcasses of lamb, 3,493 (10,391) carcasses of mutton, 1,035,066lbs. (746,884lbs.) of pork, 473,666lbs. (4,708lbs.) of beef, and 93,179lbs. (———lbs.) of veal.

VIII. Value of Pastoral and Dairying Industries.

Provisional for 1934-35, £5,430,000 (£6,857,996); decrease, £1,427,996.

LIVESTOCK AS AT 31ST DECEMBER, 1934 IN COMPARISON WITH 31ST DECEMBER, 1933.

Division.	Sheep.		Cattle.		Horses, 1933-1934.	Pigs, 1934-1934.
	1934.	1933.	1934.	1933.		
	No.	No.	No.	No.	No.	No.
Central	1,611,019	1,615,925	124,492	129,658	59,933	41,912
Lower North	1,186,941	1,262,400	41,777	41,404	40,941	15,575
Upper North	853,766	961,604	23,065	24,669	14,147	3,775
South-Eastern	1,513,112	1,433,809	55,976	50,280	12,443	4,577
Western	1,214,224	1,129,085	19,000	17,367	28,276	8,475
Murray Mallee	616,758	609,750	34,884	36,378	31,739	11,830
Total counties	6,995,820	7,012,573	299,194	299,756	187,479	86,144
Outside counties	889,099	928,487	47,285	52,972	11,286	153
Total State	7,884,919	7,941,060	346,479	352,728	198,765	86,297
Increase	−56,141	227,824	−6,249	39,796	1,976	−5,276

LIVESTOCK WITHIN AND WITHOUT GOYDER'S LINE OF RAINFALL, 1932 TO 1934.

Year.	Sheep.		Cattle.		Horses.	
	Total.	Percentage.	Total.	Percentage.	Total.	Percentage.
			Within Goyder's Line of Rainfall.			
1932	4,803,728	62·28	223,716	71·49	139,231	73·19
1933	5,217,669	65·70	249,387	70·70	142,490	72·41
1934	5,310,764	67·35	250,738	72·37	145,199	73·05
			Without Goyder's Line of Rainfall.			
1932	2,909,508	37·72	89,216	28·51	50,991	26·81
1933	2,723,391	34·30	103,341	29·30	54,299	27·59
1934	2,574,155	32·65	95,741	27·63	53,566	26·95

WOOL PRODUCTION.

Division.	Wool Clip.			Average Weight Fleece.		
	1934-35.	1933-34.	Increase.	1934-35.	1933-34.	Increase.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Central	12,892,385	13,136,261	−243,876	7·85	8·04	−0·19
Lower North	10,331,953	11,002,521	−670,568	8·47	8·71	−0·24
Upper North	8,958,033	8,927,704	30,329	9·28	8·69	0·59
South-Eastern	11,683,627	10,796,754	886,873	7·74	7·58	0·16
Western	10,138,861	8,874,004	1,264,857	8·11	7·73	0·38
Murray Mallee	5,110,176	5,001,285	108,891	8·16	8·65	−0·49
Total counties	59,115,035	57,738,529	1,376,506	8·19	8·16	0·03
Outside counties	9,432,259	9,929,753	−497,494	10·29	9·60	0·69
Total State	68,547,294	67,668,282	879,012	8·43	8·34	0·09

Grand Total Wool Production (clip, fellmongered and on skins exported), subject to slight revision, 1933-34, 79,288,903lbs.; 1934-35, 77,500,000lbs.; decrease, 1,788,903lbs.
Minus sign denotes decrease.

IMPORTANT WEEDS OF SOUTH AUSTRALIA.

[By G. H. CLARKE, B.Sc., Botanist at the Roseworthy Agricultural College.]

No. 16.—MILK WEED.

Euphorbia Drummondii, Boiss.

Euphorbia Drummondii is a native species of frequent occurrence on roadsides and vacant ground during the late autumn and early winter months, and so may be very much in evidence at a time when other green feed is relatively scarce. Under such conditions it is liable to be eaten by stock and may cause serious and even fatal poisoning effects. It is one of those plants from which prussic acid is set free, and although the toxicity appears to vary between wide limits in the case of specimens collected from different localities, and at different times, it has been proved in some cases to be intensely poisonous, and as little as 1lb. of the fresh leaves may contain sufficient cyanogenetic material to cause death in sheep. Travelling stock are particularly susceptible, owing partly to the fact that such animals are usually hungry, and partly to the relative abundance of the plants along the roadsides.

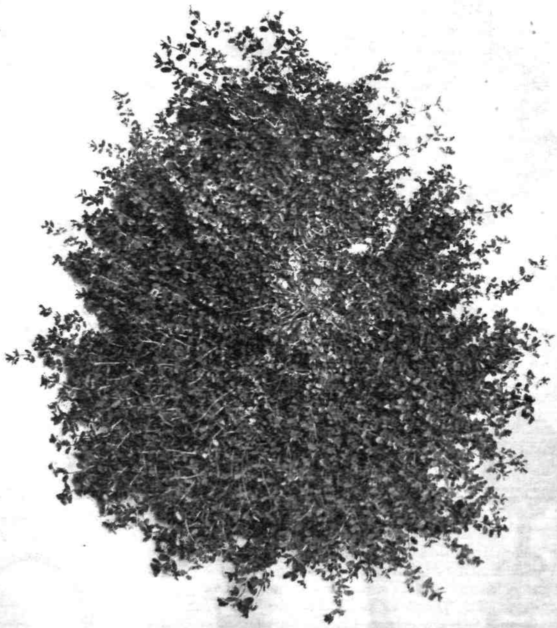
The name "Milk Weed" is due to the presence of a copious milky sap, or *latex*. Unfortunately, this character does not distinguish *E. Drummondii* from other species of *Euphorbia*, or, indeed, from other latex-producing types. The presence of latex is a noticeable feature of many different plants, and is characteristically found in certain families, among which the *Euphorbiaceae* (Spurges), *Moraceae* (Fig, Mulberry), *Apocynaceae*, and *Asclepiadaceae*, are of especial economic importance since the latex of certain of their species furnishes the india rubber of commerce. The same character is found also in the *Papaveraceae* (Poppies), the latex from one species of which (*Papaver somniferum*) yields opium, and in one tribe of the *Compositae* (*e.g.*, in Sow Thistle, Dandelion, &c.). The name "Milk Weed" does not, therefore, sharply distinguish *E. Drummondii* from a number of other weeds; but the presence of latex, considered in conjunction with its prostrate, mat-like, habit of growth, is a useful guide to the rapid identification of this weed. Other names used for the plant are "Poison Weed," *"Flat Spurge," *"Red Soldier," and *"Caustic Weed."

The plant grows flat on the ground, forming circular or oval patches a foot or less in diameter. It is of a bluish-green colour, though the stems, the stalks and margins of the leaves, and the flowers are often tinged with red, especially on their upper sides. There is a short vertical stem continuous below with the main root, and producing, near the ground level, numerous slender horizontal stems which spread outwards radially and branch repeatedly so as to form a dense prostrate mat. The stems are broadened somewhat at the nodes and have a jointed appearance which is enhanced by the presence of membranous stipules between the bases of the opposite leaves. The leaves are small, about ¼in. long, ovate-oblong, slightly notched at the summit, and with entire or minutely serrulate margins. Each leaf has a short stalk, and the base of the blade is very oblique. Though the leaves are in opposite pairs they are not attached to diametrically opposite sides of the stem at each node. The arc of circumference connecting the bases of the leaves of each pair is much shorter on the under than on the upper side. The leaf bases are continuous with membranous stipules, which are much better developed on the side in contact with the ground, becoming more lacerated and

* See C.S.I.R. Pamphlet, No. 49, "Some Important Poison Plants of North Australia."

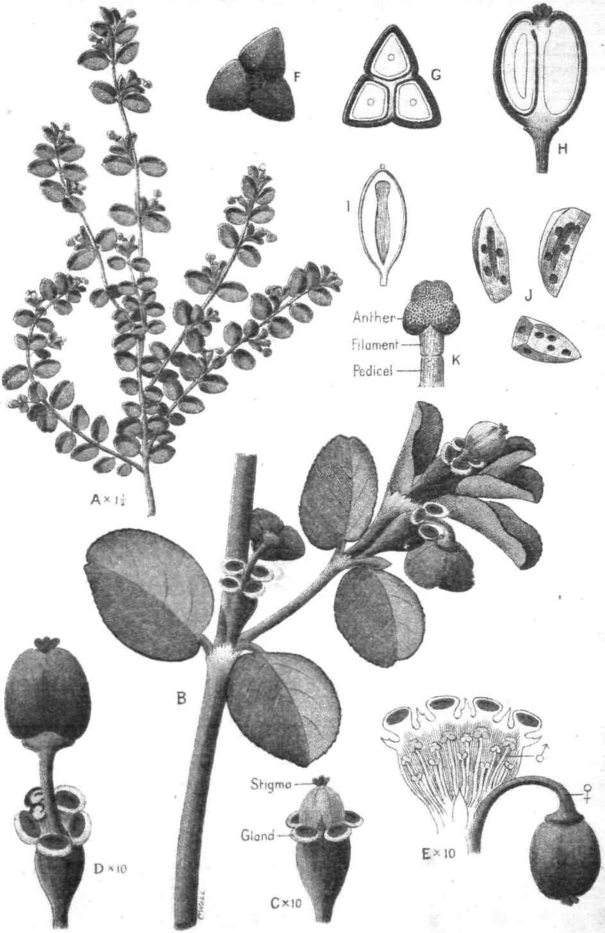
shorter on the uppermost side. Lateral branches arise in the axils of certain of the paired leaves, and the so-called "flowers" or cyathia are situated in corresponding positions at the upper nodes of the stems and branches.

The angle made by a leaf with the stem from which it arises is usually more or less acute, and, in normal erect shoots where the longitudinal axis of the stem is nearly perpendicular to the plane of the leaf-blade, the base of the blade is usually symmetrically developed. On the other hand, where the axis of the stem comes to lie in the same plane as the leaf surface, as a result, either of the stem



Single plant of *Euphorbia Drummondii* viewed from above. See coloured plate opposite.

assuming a prostrate habit as in *Euphorbia Drummondii,* or of the leaves assuming a vertical arrangement as in the older leaves of most *Eucalypts,* the part of the leaf-blade situated proximal to the midrib usually undergoes greater development than the part on the side directed towards the apex of the stem. Thus the obliquity of the base of the leaf-blade is connected with an arrangement of the leaves edge-on to the stem, an arrangement which necessitates a twisting of the leaf-stalks, and one which is facilitated by the shifting of the leaf attachments



MILK WEED (*Euphorbia Drummondii* Boiss.)

A.—Portion of plant slightly enlarged. B.—Single branch much enlarged showing arrangement of inflorescences (cyathia). C.—Young cyathium. D.—Older cyathium.
E.—Cyathium opened out showing central female flower ♀ and numerous male flowers ♂.
F.—Young capsule seen from above. G.—The same in transverse section.
H.—The same in median vertical section. I.—Single coccus of capsule removed.
J.—Seeds. K.—Male flower (greatly enlarged).

R. E. POWELL, GOVERNMENT PHOTOLITHOGRAPHER, ADELAIDE.

G. H. CLARKE, Direxit

towards the under-side of the prostrate stem. All of these characters combine, in *Euphorbia Drummondii*, to produce an appearance of flatness and regularity which is very striking.

Botanical Name and Classification.—The name *Euphorbia*, according to Pliny, was given to an African species in honour of *Euphorbus*, Greek physician to the King of Mauretania; *Drummondii* means "belonging to (*i.e.*, named after) Drummond." The name *spurge* (Latin *ex*, "out of," and *purgare*, "to purge") is given to the genus *Euphorbia* on account of the purgative properties of certain species. *Euphorbia* is the principal genus of the *Euphorbiaceae*, a family of considerable importance both medicinally and commercially. Rubber is obtained from several Euphorbiaceous plants, the most important economic species being *Hevea brasiliensis*, and *Manihot glaziovii*, both of which are cultivated for this purpose. Other species of the latter genus, *e.g.*, *M. utilissima* or Cassava, yield tapioca. *Croton* and *Ricinus* (Castor Oil Plant) are of importance in medicine. The great majority of plants belonging to the family are poisonous, and contain a milky latex which is usually acrid, and sometimes caustic. Of the 220 genera and 4,000 species comprised, the greater number occur in the tropics, but the family is well represented in the temperate parts of the world. The general habit is extremely varied, even within the single genus *Euphorbia*, and includes, in addition to shrubs and trees which are most numerous, herbs, cactus-like forms, plants with scale leaves and assimilating stems, and a few woody climbers. The 37 genera occurring in Australia are mostly herbs or shrubs. The family is represented in this State by 11 genera and about 30 species, in addition to a number of introduced forms.

Botanically the family is related, by the structure of the pistil, to the Geraniums, but it possesses certain unique characters as regards the arrangement and, in some genera, extreme reduction of the flowers. These are unisexual, and the male and female flowers may be borne on the same or on different individuals. The detailed arrangement of the flowers is very variable, but they are usually grouped together in cymes. The reduced flowers may be arranged in partial inflorescences, which, in turn, may be associated together to form large compound inflorescences. The partial inflorescences may, as in *Euphorbia*, be so condensed as to appear like single flowers. The female flowers have a superior ovary of three united carpels with one or two pendulous ovules in each loculus. The resulting fruit separates, often elastically, from the central column, and breaks up into its constituent carpels or cocci, the latter undergoing dehiscence simultaneously to liberate the seeds. The division of the family into genera depends upon the structure of the embryo in the seed, the number of ovules in each compartment of the ovary, the presence or absence of latex, and the arrangement of the inflorescences and flowers.

The Genus Euphorbia.—This genus is distinguished from others chiefly by the presence of a very characteristic partial inflorescence of reduced flowers termed a *cyathium*. The cyathia of *Euphorbia* resemble single flowers and were originally believed to be of this nature. Actually they consist of a number of greatly reduced male flowers arranged in five groups surrounding a single centrally placed female flower, the whole being enclosed within an involucre composed of five united bracts. The cyathia may be solitary and axillary, as in *E. Drummondii*, but in many species they are grouped together to form compound inflorescences which may be conspicuously coloured. For example, in the garden Poinsettia, which is *Euphorbia pulcherrima*, the cyathia are arranged in groups surrounded by large bracts coloured bright red.

The central axis of a cyathium terminates in a solitary female flower consisting of a superior trilocular ovary surmounted by three styles and borne upon a pedicel,

which is at first short and straight, but subsequently becomes elongated and bent so that the ripe ovary hangs downwards between the bracts on one side of the *involucre*. Immediately below the ovary is situated a ridge or hypogynous disc representing the position of attachment of the undeveloped perianth. The central female flower is surrounded by a variable number of reduced male flowers arranged in five groups, the oldest flowers of each group being situated nearest the centre. Each group is subtended by one of the bracts. The male flowers consist of a single stamen only. The filament of the stamen is continuous below with the pedicel or stalk of the flower, the point of junction being indicated by a constriction which, in certain other Euphorbiaceous plants, gives attachment to a rudimentary perianth. Bracteole-like structures may be present at the base of each pedicel. The five surrounding bracts are firmly united together except on one side, and, corresponding in position to each of the points of junction is a conspicuous gland, variously shaped in different species of *Euphorbia*. These glands may represent modifications of the united stipules of adjacent bracts, or they may be formed by the fusion of lateral branches of the inflorescence with contiguous parts of the bracts. *Only four glands are present on each cyathium.*

Euphorbia is a very large genus and comprises about *700* species, of which 18 are native to Australia. In this State there are 11 species, 6 of which have been introduced from Europe, while the remaining 5, including *E. Drummondii*, are native. *E. Drummondii* is distinguished from other species by having the leaves opposite and with interpetiolar stipules, by the small size of the cyathia and their arrangement singly in the leaf axils, by the red entire glands bordered by a pink or white membrane, by the absence of a caruncle from the seed, and by the glabrous and prostrate habit, etc.

Botanical Description.—A prostrate glabrous herb forming at length a perennial rhizome. Leaves opposite, orbicular-ovate or oblong, obtuse or notched, entire or serrulate, very oblique at the base, about ¼ inch long. Stipules entire, fringed, or lobed. Cyathia small, shortly stalked, in the upper leaf axils. Involucres very short, the glands red, with a very narrow pink or white border, entire or nearly so. Capsule glabrous, very small; styles notched; seeds whitish, rugose.

As a result of investigations carried out in New South Wales under the Poison Plants Committee of the Council for Scientific and Industrial Research, the presence of prussic acid has been demonstrated in the stomach contents of sheep in which death followed the administration of extracts of *Euphorbia Drummondii*. The presence in the plant, however, of cyanogenetic glucosides in sufficient amounts to cause fatal poisoning seems to be the exception rather than the rule. Of several hundred plants examined from various parts of New South Wales it is reported that less than 10 per cent. were poisonous, and that most of these came from certain districts of the State; also that the number of poisonous plants was relatively greater in summer and autumn than at other periods of the year. According to Seddon, the conditions which determine the production of cyanogenetic glucoside in this plant are not yet known. That it may, under certain conditions, cause rapidly fatal results seems to be definitely established.

REFERENCES.

1. Bentham, G., *Flora australiensis*, volume I.
2. Black, J. M., *Flora of South Australia*, 1922-9.
3. Haber, J. M., Anatomy and Morphology of the Flower of Euphorbia," *Annals of Botany*, 39, 1925.
4. Poison Plants Committee: "Some Important Poison Plants of North Australia," C.S.I.R. Pamphlet No. 49, Melbourne, 1934.
5. Seddon, H. V., "*Euphorbia Drummondii*, proved poisonous to Sheep," *Agricultural Gazette*, N.S.W., volume 39, Oct., 1928.
6. Willis, J. C., *A Dictionary of the Flowering Plants and Ferns*, 6th edition, 1931.

OFFICIAL SINGLE TEST EGG-LAYING COMPETITION, 1935-36.

CONDUCTED AT PARAFIELD POULTRY STATION.

ONLY FIRST GRADE EGGS RECORDED.

SECTION 1.—WET MASH.

Class No. 1.—White Leghorns.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 31st July, 1935.	
B. Cooke, Kanmantoo.	1	44	
	2	34	
	3	42	120
	4	49	
	5	61	
	6	66	176
			296
	7	—	
	8	—	
	9	—	—
	10	—	
	11	—	
	12	—	—
			—
A. H. Matthews, Bridgewater	13	58	
	14	—	
	15	74	132
	16	66	
	17	52	
	18	37	155
			287
H. F. Muirson, Yundi.	19	5	
	20	32	
	21	22	59
	22	35	
	23	59	
	24	58	152
			211
E. McKee, 5, Rose Street, Carrondown.	25	58	
	26	77	
	27	79	214
	28	79	
	29	82	
	30	66	227
			441
H. C. Stacy, Meadows.	31	29	
	32	65	
	33	76	170
	34	31	
	35	54	
	36	79	164
			334
T. Cleaver, Bridgewater.	37	12	
	38	22	
	39	50	84
	40	59	
	41	16	
	42	34	109
			193
C. Sandstrom, Yundi.	43	42	
	44	—	
	45	53	95
	46	23	
	47	24	
	48	67	114
			209
A. J. Monkhouse, Woodside.	49	40	
	50	72	
	51	53	165
	52	71	
	53	23	
	54	44	138
			303
J. F. Smith, Meadows.	55	44	
	56	58	
	57	7	109
	58	20	
	59	2	
	60	65	87
			196
A. Young, Bridgewater.	61	61	
	62	47	
	63	48	156
	64	15	
	65	63	
	66	44	122
			278
R. W. McAlister, Yundi.	67	37	
	68	37	
	69	57	131
	70	24	
	71	12	
	72	39	75
			206
T. Duhring, Mallala.	73	68	
	74	67	
	75	29	164
	76	36	
	77	58	
	78	60	154
			318
R. J. Underdown, Meadows.	79	36	
	80	32	
	81	66	134
	82	33	
	83	52	
	84	61	146
			280
S. Hill, Bridgewater.	85	29	
	86	60	
	87	56	145
	88	57	
	89	66	
	90	48	171
			316
W. R. Hedger, Yundi.	91	11	
	92	27	
	93	28	66
	94	36	
	95	10	
	96	36	82
			148

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 31st July, 1935.	
Langmaid & Bettison, Salisbury.	97	14	
	98	34	
	99	20	68
	100	52	
	101	12	
	102	—	64
			132
E. Portlock, Meadows.	103	72	
	104	46	
	105	52	170
	106	39	
	107	32	
	108	64	135
			305
Murray Powell, Jupiter Creek.	109	70	
	110	6	
	111	54	130
	112	29	
	113	78	
	114	35	142
			272
G. W. Bignell, Meadows.	115	58	
	116	35	
	117	25	118
	118	32	
	119	57	
	120	57	146
			264
W. M. Field, Yundi.	121	48	
	122	18	
	123	31	97
	124	4	
	125	41	
	126	61	106
			203
C. R. Wharton, Meadows.	127	49	
	128	58	
	129	61	168
	130	64	
	131	52	
	132	61	177
			345
H. H. Hefford, Murray Bridge.	133	40	
	134	64	
	135	52	156
	136	23	
	137	67	
	138	46	136
			392
F. W. Gage, Meadows.	139	38	
	140	1	
	141	dead	39
	142	53	
	143	21	
	144	33	107
			146
W. H. L. Norman, Echunga.	145	63	
	146	38	
	147	—	101
	148	68	
	149	38	
	150	15	121
			222

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 31st July, 1935.	
B. R. Whittington, Yundi.	151	65	
	152	9	
	153	30	104
	154	54	
	155	53	
	156	22	129
			233
B. C. Sanders, Meadows.	157	56	
	158	64	
	159	63	183
	160	55	
	161	4	
	162	12	71
			254
H. H. Gallagher, Pooraka.	163	12	
	164	43	
	165	54	109
	166	20	
	167	12	
	168	50	82
			191
W. Sickert, Meadows.	169	70	
	170	31	
	171	60	161
	172	42	
	173	67	
	174	69	178
			339
W. Restall, Echunga.	175	10	
	176	—	
	177	21	31
	178	51	
	179	36	
	180	61	148
			179
A. G. Dawes, 230, Portrush Road, Glenunga.	181	60	
	182	36	
	183	27	123
	184	6	
	185	45	
	186	61	112
			235
G. W. Sykes, Yundi.	187	49	
	188	15	
	189	23	87
	190	23	
	191	22	
	192	58	103
			190
R. Bartley, Meadows.	193	41	
	194	69	
	195	53	163
	196	42	
	197	46	
	198	57	145
			308
A. & H. Gurr, Mindaroo Poultry Farm, Bradbury.	199	29	
	200	30	
	201	43	102
	202	58	
	203	15	
	204	29	102
			204

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 31st July, 1935.	
J. J. Devlin, Meadows.	205	50	
	206	50	
	207	74	174
	208	48	
	209	20	
	210	68	136
			310
D. J. Foxwell, Echunga.	211	66	
	212	21	
	213	15	102
	214	14	
	215	51	
	216	3	68
			170
F. J. Buck, Meadows.	217	42	
	218	44	
	219	78	164
	220	47	
	221	49	
	222	37	133
			297
J. A. Grist, Yundi.	223	10	
	224	—	
	225	21	31
	226	2	
	227	—	
	228	34	36
			67
L. A. King, Meadows.	229	62	
	230	52	
	231	42	156
	232	—	
	233	49	
	234	3	52
			208
R. W. Sando, Echunga.	235	51	
	236	50	
	237	44	145
	238	50	
	239	46	
	240	23	119
			264
E. W. Young, Meadows.	241	64	
	242	48	
	243	42	154
	244	48	
	245	—	
	246	2	50
			204
A. Jarvis, Yundi.	247	46	
	248	22	
	249	17	85
	250	45	
	251	26	
	252	72	143
			228
[illegible]	253	2	
	254	3	
	255	—	5
	256	2	
	[illegible]	[illegible]	[illegible]

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 31st July, 1935.	
S. Bridge, Yundi.	259	42	
	260	59	
	261	46	147
	262	26	
	263	42	
	264	26	94
			241
H. G. Egarr, Meadows.	265	55	
	266	55	
	267	23	133
	268	17	
	269	55	
	270	32	104
			237
R. H. Smith, Yundi.	271	60	
	272	30	
	273	41	131
	274	68	
	275	23	
	276	45	136
			267
J. M. Lawson, Meadows.	277	58	
	278	53	
	279	42	153
	280	47	
	281	58	
	282	46	151
			304
J. O. Marshall, Yundi.	283	6	
	284	37	
	285	46	89
	286	63	
	287	52	
	288	26	141
			230
G. Joyce, Meadows.	289	12	
	290	78	
	291	48	138
	292	56	
	293	60	
	294	44	160
			298
J. A. Bradtke, Yongala.	295	7	
	296	—	
	297	40	
		47	
W. H. A. Hodgson, Salisbury.	298	74	
	299	54	
	300	60	
		188	
A. W. McDonald, Gawler.	301	36	
	302	35	
	303	43	
		114	
[illegible]	304	28	
	305	70	
	306	1	
		99	

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EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 31st July, 1935.	
A. P. Urlwin, Balaklava.	307	50	
	308	40	
	309	9	
		99	
L. S. Ekers, Mount Compass.	310	52	
	311	9	
	312	62	
		123	
V. E. Williams, Semaphore Park.	313	55	
	314	60	
	315	57	
		172	
F. P. Munzberg, Tanunda.	316	55	
	317	48	
	318	57	
		160	
Total Class 1		12,669	

Class 2—Any Other Light Breed.

Competitor.	Bird No.	First Grade Eggs.	
Langmaid & Bettison, Salisbury. (Black Minorcas.)	319	29	
	320	42	
	321	59	
		130	
A Heaysman, Government Road, Eden Hills. (Cuckoo Leghorns.)	322	36	
	323	72	
	324	36	
		144	
Total Class No. 2.		274	

Class No. 3—Black Orpingtons.

Competitor.	Bird No.	First Grade Eggs.	
A. G. Dawes, 230, Portrush Road, Glenunga.	325	32	
	326	14	
	327	77	123
	328	47	
	329	37	
	330	35	119
			242
H. J. Mills, 108, Edward Street, Edwardstown.	331	51	
	332	43	
	333	38	132
	334	30	
	335	55	
	336	dead	85
			217
K. Pennack, Pooraka.	337	67	
	338	52	
	339	15	134
	340	61	
	341	47	
	342	22	130
			264
H. H. Gallagher, Pooraka.	343	42	
	344	19	
	345	42	103
	346	43	
	347	31	
	348	16	90
			193
B. Cooke, Kanmantoo.	349	17	
	350	23	
	351	19	
		59	
H. H. Hefford, Murray Bridge.	352	58	
	353	16	
	354	25	
		99	
J. H. Dowling, Glossop.	355	14	
	356	14	
	357	47	
		75	
L. S. Ekers, Mount Compass.	358	42	
	359	22	
	360	41	
		105	
A. G. Dawes, 230, Portrush Road, Glenunga.	452	1	
	453	26	
	454	32	59
	455	1	
	456	43	
	457	38	82
			141
A. P. Urlwin, Balaklava.	465	29	
	466	43	
	467	35	
		107	
Total Class No. 3		1,502	

Class No. 4.—Any Other Heavy Breed.

Competitor.	Bird No.	First Grade Eggs.	
H. J. Mills, 108, Edward Street, Edwardstown. (Rhode Island Reds.)	361	1	
	362	dead	
	363	23	24
	364	88	
	365	60	
	366	dead	148
			172
A. G. Dawes, 230, Portrush Road, Glenunga. (Rhode Island Reds.)	367	36	
	368	36	
	369	22	94
	370	48	
	371	40	
	372	20	108
			202
F. F. Welford, 1, Ludgate Circus, Colonel Light Gardens. (Rhode Island Reds.)	373	40	
	374	55	
	375	29	124
	376	3	
	377	26	
	378	24	53
			177
V. F. Gameau, Findon Road, Woodville. (Rhode Island Reds.)	379	16	
	380	67	
	381	71	154
	382	51	
	383	12	
	384	47	110
			264

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 31st July, 1935.	
K. Pennack, Pooraka. (Barnevelders.)	385	37	
	386	37	
	387	27	101
	388	51	
	389	47	
	390	68	166
			267
A. G. Dawes, 230, Portrush Road, Glenunga. (Rhode Island Reds.)	458	2	
	459	27	
	460	57	86
	461	15	
	462	34	
	463	41	90
			176
Total Class No. 4			1,258

SECTION 2.—DRY MASH.

Class No. 5.—White Leghorns.

Competitor.	Bird No.	First Grade Eggs.	
G. R. Cowell, Balhannah.	391	59	
	392	22	
	393	7	88
	394	18	
	395	18	
	396	50	86
			174
A. J. Monkhouse, Woodside.	397	36	
	398	44	
	399	41	121
	400	28	
	401	42	
	402	52	122
			243
G. R. Cowell, Balhannah.	403	48	
	404	34	
	405	25	107
	406	31	
	407	23	
	408	22	76
			183
Total Class No. 5			600

Class No. 7.—Black Orpingtons.

Competitor.	Bird No.	First Grade Eggs.
W. R. Christie, Upper Mitcham.	409	45
	410	10
	411	33
		88
Total Class No. 7		88

Class No. 8.—Any Other Heavy Breed.

Competitor.	Bird No.	First Grade Eggs.
W. R. Christie, Upper Mitcham. (Rhode Island Reds.)	412	37
	413	26
	414	48
		111
Total Class No. 8		111

SECTION 3.—WET MASH.

Home Project Utility Section.—Any Breed.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 31st July, 1935.
Peter Western, Ascot Park School. (White Leghorn.)	415	71
Peter Western, Ascot Park School. (White Leghorn.)	416	67
William Sando, Echunga School. (White Leghorn.)	417	43
Douglas Marshall, Yundi School. (White Leghorn.)	418	47
Norman Page, Murray Bridge School. (White Leghorn.)	419	44
Kelvyn & Brian Nicholls, Finniss School. (White Leghorn.)	420	41
Dean Colwell, Grange School (White Leghorn.)	421	33
Warren Hannaford, Paracombe School. (White Leghorn.)	422	64
W. Horne, Woodville School. (White Leghorn.)	423	59
Owen Robinson, Ascot Park School. (White Leghorn.)	424	63
June Chapman, Woodchester School. (White Leghorn.)	425	22
Rosa Hunt, Morphett Vale School. (White Leghorn.)	426	41
Jack O'Sullivan, Morphett Vale School. (White Leghorn.)	427	56
Peter Taylor, Morphett Vale School. (White Leghorn.)	428	19
James Taylor, Morphett Vale School. (White Leghorn.)	429	44
William Gregory, Victor Harbour School. (White Leghorn.)	430	25
Ian Bruce, McLaren Flat School. (White Leghorn.)	431	14
Clifford Burford, Smithfield School. (White Leghorn.)	432	8
Tom Callaghan, Smithfield School. (White Leghorn.)	433	—
Eric Pratt, Abattoirs School. (White Leghorn.)	434	71
Stanley Pratt, Abattoirs School. (White Leghorn.)	435	55
Alan Yelland, Cunliffe School. (Minorca.)	436	35
Gordon Gallasch, Gilles Plains School. (White Leghorn.)	437	42

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 31st July, 1935.
Clarence King, Tarlee School. (White Leghorn.)	438	6
Olive Pitman, Gilles Plains School. (Black Orpington.)	439	78
Donald Heading, Sturt School. (Black Orpington.)	440	61
Clive Steer, Sturt School. (Black Orpington.)	441	44
Herbert Oliver, McLaren Vale School. (Black Orpington.)	442	68
Lyol Stone, Morphett Vale School. (Black Orpington.)	443	72
Ray Candy, Noarlunga School. (Black Orpington.)	444	31
Malcolm Booth, Bridgewater School. (Black Orpington.)	445	70
Murray Heneker and Frank Short, Hamley Bridge School. (Black Orpington.)	446	43
Peter Boucaut, Seaton Park School. (Rhode Island Red.)	447	21
Peter Preece, Gilles Plains School. (Rhode Island Red.)	448	44
Cliff Crosser, Wellington Road School. (White Leghorn.)	449	67
John Keldoulis, Orroroo School. (Black Orpington.)	450	48
Bruce Dooland, Thebarton School. (Black Orpington.)	451	9
Alan Yelland, Cunliffe School. (Rhode Island Red.)	464	2
Total		1,628

FEEDING TESTS AT PARAFIELD POULTRY STATION.

[New Series of Tests by C. F. ANDERSON, Government Poultry Expert.]

In continuing the experimental feeding tests at Parafield Poultry Station, a new series of tests commenced on 1st April, 1935. Five tests each of 50 white Leghorn pullets were selected. The pullets were chosen as nearly even in age, type, and maturity as was possible.

In order to gain further information on the various methods of feeding, some of the tests are similar to the series which concluded on 31st March, 1935.

The following are the methods to be adopted, together with the results from 1st April to 30th June.

Feeding Tests commenced on 1st April, 1935.

1. Wet mash, composed of crushed barley and crushed wheat, with greenfeed and meatmeal; 2ozs. wheat per day.

2. Standard bran and pollard mash, with greenfeed and meatmeal; 1½ozs. wheat per day.

3. Bran and crushed wheat mash, with greenfeed and meatmeal; 2ozs. wheat per day.

4. Mash of crushed oats and crushed wheat with greenfeed and meatmeal; wheat, 2ozs. per day.

5. Commencing with a crushed barley and crushed wheat mash, greenfeed, meatmeal and then the feeding to be changed according to the season of the year.

	No. Eggs Laid 1st April, 1935, to 30th June, 1935.	No. Eggs Laid Month of July, 1935.	Total Eggs Laid 1st April, 1935, to 31st July, 1935.
No. 1 Test	1,192	536	1,728
No. 2 Test	1,258	518	1,776
No. 3 Test	1,156	656	1,812
No. 4 Test	905	559	1,464
No. 5 Test	924	541	1,465

DEPARTMENT OF AGRICULTURE.

SINGLE TEST EGG-LAYING COMPETITION, 1935-36.

Conducted at Parafield Poultry Station.

WINTER TEST.

LEADING SCORES TO MONTH ENDED 31st *JULY*, 1935.—

FIRST GRADE EGGS ONLY.

SECTION 1.—WET MASH.

Class 1.—*White Leghorns.*

Singles—

	Eggs Laid.	Bird Nos.
E. McKee	82	29
E. McKee	79	28
E. McKee	79	27
H. C. Stacy	79	36

PARAFIELD POULTRY STATION.

NOW BOOKING ORDERS FOR SPRING, 1935.

ECGS FOR HATCHING AND DAY OLD CHICKENS

WHITE LEGHORNS.

EGGS.—7s. 6d. per Setting of 15 Eggs. Incubator Lots, 30/- per 100.

DAY OLD CHICKENS.—15s. per dozen; £3/10/- in lots of 100.

BLACK ORPINGTONS.

EGGS.—10/- per Setting of 15 Eggs. Incubator Lots, £2 per 100.

DAY OLD CHICKENS.—17/6 per dozen; £4 per 100.

BLACK MINORCAS.

EGGS.—7s. 6d. per Setting of 15 Eggs. Incubator Lots, 30/- per 100.

DAY OLD CHICKENS.—15s. per dozen; £3/10/- in lots of 100.

Free on Rail, Salisbury.

DELIVERY.—CHICKS—July to September.
EGGS—July to September.

Intending breeders should realise the importance of establishing their flocks with only the very best of stock, also pay particular care to the size of the egg. The future of the poultry industry in South Australia is almost entirely dependent on the export trade; the size of the egg for export is of the greatest importance. The breeding stock at Parafield is carefully selected and every egg set or sold is of a minimum weight of 2ozs., and a large percentage considerably over.

All Eggs and Chickens sold from Parafield Poultry Station are guaranteed to be produced at Parafield.

EARLY BOOKING IS ADVISABLE.

Further particulars can be obtained from the Manager, Parafield Poultry Station, Salisbury, or Poultry Expert, Department of Agriculture, Flinders Street, Adelaide.

C. F. ANDERSON, Poultry Expert.

Trios—		
E. McKee	227	28–30
E. McKee	214	25–27
W. H. A. Hodgson	188	298–300
Teams—		
E. McKee	441	25–30
C. R. Wharton	345	127–132
W. Sickert	339	169–174

Class No. 2.—Any other Light Breed.

Singles—		
A. Heaysman (Cuckoo Leghorn)	72	323
Langmaid and Bettison (Black Minorca)	59	321

Class No. 3.—Black Orpingtons.

Singles—		
A. G. Dawes	77	327
K. Pennack	67	337
K. Pennack	61	340
Trios—		
K. Pennack	134	337–339
H. J. Mills	132	331–333
K. Pennack	130	340–342
Teams—		
K. Pennack	264	337–342
A. G. Dawes	242	325–330
H. J. Mills	217	331–336

Class 4.—Any other Heavy Breed.

Singles—		
H. J. Mills (Rhode Island Red)	88	364
V. F. Gameau (Rhode Island Red)	71	381
K. Pennack (Barnevelder)	68	390
Trios—		
K. Pennack (Barnevelder)	166	388–390
V. F. Gameau (Rhode Island Red)	154	379–381
H. J. Mills (Rhode Island Reds (2 birds only competing)	148	364–366
Teams—		
V. F. Gameau (Rhode Island Reds)	264	379–384
K. Pennack (Barnevelder)	267	385–390
A. G. Dawes (Rhode Island Reds)	202	367–372

SECTION 2.—DRY MASH.

Class No. 5.—White Leghorns.

Singles—		
G. R. Cowell	59	391
A. J. Monkhouse	52	402
G. R. Cowell	50	396
Trios—		
A. J. Monkhouse	122	400–402
A. J. Monkhouse	121	397–399
Teams—		
A. J. Monkhouse	243	397–402
G. R. Cowell	183	403–408

Class No. 6.—Black Orpingtons.

Singles—		
W. R. Christie	45	409

Class No. 8.—Any other Heavy Breed.

W. R. Christie	48	414

SECTION 3.—WET MASH.

Singles—		
Olive Pitman, Gilles Plains (Black Orpington)	78	439
Lyol Stone, Morphett Vale (Black Orpington)	72	443
Peter Western, Ascot Park (White Leghorn)	71	415
Eric Pratt, Abattoirs (White Leghorn)	71	434
Malcolm Booth, Bridgewater (Black Orpington)	70	445

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

CONFERENCE OF UPPER NORTH BRANCHES.

In declaring open the Annual Conference of Upper North Branches of the Agricultural Bureau, which was held at Booleroo Centre on 17th July, the Hon. A. L. McEwin, M.L.C. (*member Advisory Board of Agriculture*) paid a tribute to the enthusiasm of members associated with the Branches of the Bureau in the Upper North district of the State. It was particularly pleasing, he said, to see what he thought to be a record attendance at an opening session of any Conference, the number present being estimated at 300. He regretted that they had not shared in the good rains which had recently been recorded in other parts, but, with the true optimism of the northerners, they were still hopeful of getting a good rain. Delegates were present from the following Branches:—Wilmington, Morchard, Murraytown, Laura, Appila, Wirrabara, Eurelia, Baroota, Yandiah, Booleroo Centre, Melrose, Gladstone, and Wepowie.

Professor A. J. Perkins (Director of Agriculture), Messrs. R. C. Scott (Supervisor Experimental Work), H. B. Barlow (Chief Dairy Instructor), E. L. Orchard and J. O. Hatter (District Instructors), C. A. Goddard (Assistant Wool Instructor, School of Mines), H. C. Pritchard (General Secretary), and F. C. Richards (Assistant Secretary Agricultural Bureau), attended on behalf of the Department of Agriculture. Mr. W. G. Gregurke (Wepowie) occupied the chair. The following papers were read and discussed:—"Farm Economy," R. M. Harvie (Appila); "Farm Machinery," A. Scholz (Murraytown); "Hobbies," P. J. Curnow (Wirrabara). The agenda contained a large number of questions dealing with fertilisers, quality in wheat, wheat prices, and horticultural subjects, which were answered by officers of the Department of Agriculture. The following resolutions were carried.

Diabolo Separator Coy (S.A.) Ltd.
117-119 CURRIE STREET,
ADELAIDE.

"That the Government be asked to amend the Noxious Weeds Act to accept responsibility for the destruction of noxious weeds on all stock roads within district council boundaries."

"That a system of bulk handling of wheat be commenced immediately in the farming areas of this State."

"That the judges' score cards be put on exhibits of wheat taken from crop competitions and displayed at the Royal Agricultural and Horticultural Society Show."

The Hon. A. L. McEwin, M.L.C., presented life membership certificates of the Agricultural Bureau to Messrs. J. F. Burns (Wepowie) and R. Kitto (Black Rock).

At the evening session Mr. C. A. Goddard gave an address, "Management of the Farm Flock."

The members of the Wepowie Branches staged an exhibit, which included green fodders, vegetables, cereals, preserved fruits, and jams, dairy produce, dressed poultry, and a collection of women's needlework and other handicrafts. They also provided an excellent luncheon and tea for the visitors. A report of the Conference would not be complete without an appreciation of the manner in which the Conference was organised, and the Committees and Hon. Secretaries of the Wepowie Branches are worthy of special mention.

CONFERENCES AT KAROONDA AND LAMEROO.

Mr. A. J. A. Koch (member, Advisory Board of Agriculture) delivered the opening address at the Conference of Western Murray Lands Branches of the Agricultural Bureau, which was held at Karoonda—under the auspices of the Borrika Branch—on August 6th. Mr. C. W. Jones presided, and Messrs. W. J. Spafford (Deputy Director of Agriculture), R. C. Scott (Supervisor of Experimental Work), R. L. Griffiths, P. H. Suter, E. Leishman (District Instructors), H. C. Pritchard (General Secretary, Agricultural Bureau), and F. C. Richards (Assistant Secretary) attended on behalf of the Department of Agriculture. Delegates were present from the Chapman's Bore, Yurgo, Wynarka, Copeville, Coomandook, Moorlands, Karoonda, Kulkawirra, and Borrika Branches. The agenda included a variety of questions relating to stock feeding, milling quality of wheats, fat lambs, &c., which were answered by officers of the department, and the following papers were read and discussed:—"Is the Farmer an Asset to the State or a Liability?" (Mr. E. L. Cowled, Borrika), "The Future of the Murray Mallee" (Mr. R. Elliot, Kulkawirra). "Methods of Cropping" (Mr. J. Bullen, Yurgo), "The Horse on the Farm" (Mr. G. H. Sutherland, Copeville), "Experiences in Fruit Growing on Murray Mallee" (Mr. W. R. Trestrail, Coomandook), "Birds and Their Value to the Man on the Land" (Mr. M. Ballard, Coomandook).

Conference decided:—"That next year's gathering should be held at Karoonda, the Yurgo Branch to be responsible for the arrangements."

"That the Conference express its hearty appreciation of the services rendered by Mr. R. L. Griffiths (District Agricultural Instructor), and trusts that his services will be retained."

"That the Advisory Board of Agriculture and Farmers' Assistance Board should work on more co-operative lines in regard to applicants under the Act."

"That the method used by the Yurgo Branch for their local District Crop Competition be discussed with a view to having the District Crop Competition brought under the same conditions, which are as follows:—Area to be judged, 50 acres; plan of area together with a previous history of cultivation to be in the hands of the Branch Secretary not later than July. That there be 10 entries or no competition. Any farmer may have more than one area entered, and may show three varieties in any one piece. To be three prizes, but no farmer to get more than one prize in any one year."

"That the dock on bleached wheat is a matter for investigation by the Advisory Board."

At the evening session Mr. Spafford spoke on his recent trip abroad.

PINNAROO LINE BRANCHES.

Presided over by Mr. E. A. Blake (Chairman of the Lameroo Bureau). Branches of the Agricultural Bureau situated along the Pinnaroo Line held their Annual Conference at Lameroo on August 8th. Rain which fell during the morning session of the Conference somewhat adversely affected the attendance, later there was a good representation of delegates from the Parilla Well, Parrakie, Parilla, Geranium, Pinnaroo, Clanfield, Karte, and Lameroo Branches. Mr. A. J. A. Koch (Member of the Advisory Board) delivered the opening address, in the course of which he explained the functions of the Board, and made reference to recent activities of the Bureau, emphasising the progress that had been made by Women's Branches. Conferences of the Agricultural Bureau in the immediate past had devoted practically the whole of their discussions to general farm efficiency in the various phases of agriculture. He thought that future gatherings should consider the advisability of giving consideration to what were to be the future farm practices of the Mallee districts. To the Branch representatives for next year's Conference he suggested that a Committee might be formed which would decide on the subjects that would be included on the Agenda.

Mr. C. H. Ross, of Pinnaroo, read a paper, "Colt Breaking," and Mr. L. Orwell (Lameroo) discussed the subject, "Can more Use be made of the Department of Agriculture and the Agricultural Bureau by the Man on the Land?" "Fat Lamb Breeding in the Mallee" was the subject of a paper contributed by Mr. R. Jenkins, of Lameroo.

Messrs. W. J. Spafford and R. C. Scott took part in the discussions following the reading of the papers, and replied to questions submitted by delegates.

It was decided to hold the 1936 Conference at Pinnaroo.

Mr. R. L. McKenzie (Pinnaroo) moved and Mr. L. Orwell (Clanfield) seconded a motion that the Advisory Board be asked to set up a Chamber of Rural Primary Products through the Agricultural Bureau.

A Committee consisting of Messrs. R. L. McKenzie (Pinnaroo), L. Orwell (Clanfield), and R. Jenkins (Lameroo) was appointed to draw up and submit to the Advisory Board a scheme for the institution of the Chamber.

Mr. H. G. Johnston (Secretary of the Chandos Crop Competition Committee) gave a report of the 1934-35 season, and Mr. Spafford made the following presentations:—First, F. H. Whittlesea, Jabuk, 92 points, writing desk; Second, C. W. Rundle, Lameroo, 91½ points, E.P. coffee pot; Third, H. A. Steer, Lameroo, 90½ points, stainless cutlery; Fourth, E. Ross, Parrakie, 88½ points, water jug and glasses. The junior Competition was won by Master Ron Neindorf, Parilla, set of hair brushes.

The Lameroo Branch entertained delegates at tea, and at the evening session Mr. Spafford spoke on his trip to South America.

PURSUIT OF KNOWLEDGE.

The main purpose and endeavour of active educational effort must necessarily be the training and equipping of youth to face and successfully surmount the trials and problems of life.

In all things, a habit commenced in childhood, while the mind and individuality are plastic, is far more likely to prove lasting than when begun later in life.

It was with a full conception of at least one great purpose in the pursuit of knowledge that the Commonwealth Savings Bank planned its service to apply as directly for the benefit of children as for adults. The depositing of regular weekly sums in a Savings Bank account is a practical and logical illustration of the thrift lesson, and the Commonwealth Savings Bank has extended its facilities throughout all Australia to make that lesson easy and valuable.

Commonwealth Savings Bank of Australia

PAPERS READ AT CONFERENCES.

UPPER NORTH CONFERENCE, BOOLEROO CENTRE, 16th JULY.

FARM ECONOMY.

[R. M. HARVIE, Appila.]

Farming at present is a non-payable proposition and one is often at a loss to know just where economy begins or ends and whether money spent for extra labour or plant is really economy or extravagance. Unless the farm is too small, it pays to employ. Economy lies not so much in rigidly curtailing all expenditure as in spending wisely and putting money into farming operations that would show more profit. Very often it is false economy to persevere too much with old harvest machinery, when it has become badly worn and especially when the harvester becomes a wheat waster. A farmer could easily lose enough wheat to pay a deposit on a new machine. The same applies to employing men in the harvest operations who are careless about their work. Power farming is too expensive at the present price of wheat. During the last few years the horse breeders have had a good harvest, so by using horses and breeding a couple of foals each year one would again be economising. All harness leather should be well oiled with neatsfoot oil. The cost of the oil would more than doubly pay for itself. Good oil and a good oilcan should be a golden rule with all farmers. Oil is cheaper than bearings. It is no trouble to get a man to oil a machine well if he has a good oilcan to do it with, and a few shillings spent in that direction may mean pounds saved in bearings. It is often good economy to have an assortment of nuts and bolts on the farm, and a pound or two spent in that direction is a good idea. A good supply of scrap iron would be most useful at the farm smithy. A pound or two spent to secure an old machine at a sale would often return 10 times its value in bolts and iron that one could get out of them. A good set of wrenches and proper tools saves time when making repairs. One should always work with a system and keep up the seasonal jobs, especially field work. See that the harvester and binder are in perfect order before commencing with them, because, really speaking, time is economy, more so when one loses the time during the harvest. A substantial economy could be effected by farmers combining to buy their own necessities, particularly cornsacks. I believe if we were to send direct to the manufacturers it would be surprising what we could save. Super bags can be washed carefully and used for seed wheat or for oats or barley and may be used for rugging sheep. Crushed grain for stock is much to be preferred in economy to the whole grain. The control of mice and rats, where possible, very greatly reduces the amount of waste on a farm. It is not always the hard worker alone who succeeds, but the man who thinks and works out his problems for himself. Stopping to think in certain directions helps in the way of economy. In another way good judgment also would be of an assistance. We know that we all do not do things alike, or it may be that we do a thing a certain way, and know no other better way, until someone tells us. Therefore, farmers should belong to the Bureau so as to help one another. Doing this would be another aid to farm economy.

HOBBIES.

[P. J. CURNOW, Wirrabara.]

To put spare time to profitable use, the adoption of a hobby is an excellent method to expand knowledge on some subject which has a natural appeal. In the latter con[illegible]n, only something that satisfies some trait in character is taken up as a hobby. [illegible]bbies may be turned to profitable account, such, for instance, as amateur [illegible]y, but the average hobbyist is content to derive pleasure and instruction [illegible]e-time pursuit. It has been said that a boy with a hobby is generally a [illegible] who may be trusted to give close attention to his usual studies, and

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who can then turn for relaxation to some hobby that has a special appeal for him. It is unusual, indeed, to find young people who have not, even for a short time, taken up some hobby, either for amusement or instruction. Most boys and girls are somewhat erratic in their pursuit of spare-time callings. They enthuse very often for a short time over some special hobby which appeals for the time being, but which is readily thrown aside for something new. In this regard, they are no worse, possibly, than their elders, but there are exceptions, of course. How often has the keen and lasting pursuit of some hobby led to a choice of a successful career on similar lines? Many brilliant engineers date their success from the time when, as boys, they played with their toy trains or attempted to construct from directions given in boys' papers or simple textbooks articles of a mechanical character.

A child's natural bent will decide the type of hobby he or she will take up. The boy with an artistic flare will naturally turn to his paint box and easel. The girl who has a love for music does not mind the so-called drudgery of practising interminable scales. As she becomes more skilled the inherent beauties of pieces by the great masters are brought out, and in themselves are a reward for diligent work in the earlier stages of instruction. Where there is no inborn love of music, the young student soon tires of the study and gives up. Possibly a hobby of another type may make some appeal to this same young person, a hobby that may prove instructive and may hold the attention of the child for a lengthy period. There is an infinity of pastimes to suit every conceivable taste.

For boys the collecting of stamps is a most instructive hobby; the desire to make things appeals to many others. Here the instruction given at school in woodworking classes offers an excellent chance to bring out, in at least some boys, those traits which impel some hobbyists to want to make useful things from all kinds of wood in their spare time. Many young carpenters do very creditable work indeed. The keeping of live pets seems to appeal to almost every boy at some time or other. Too often though, some children soon tire of giving their animal friends that close attention in relation to feeding and watering which is so necessary for their wellbeing. The votaries of the camera are counted in their thousands, and the advent of the film camera has given a great impetus to the photographic art. In the old days when the amateur had to own almost a small drug shop to successfully take and develop photos the hobby was a messy one and fairly expensive to conduct. To-day everything has been so simplified that photography as a hobby makes a strong appeal to many who would not care to attempt the art under the old conditions. In addition to the amusement and instruction obtained from this particular form of hobby, profit can often be made from the sale of pictures.

Girls find pleasure and profit in knitting and making pretty things for the home. When most girls reach the age of 18 they begin to think of a Glory Box, and deft fingers turn out not only beautiful, but useful things.

The science of botany, the collecting and mounting of flowers when pressed, collecting shells, curios, chess, draughts, cross word puzzles, and every other form of pastime have their votaries. But in the field of sport Australian boys and girls find their greatest avenues for amusement. Every Australian boy who cannot play cricket of a sort is an oddity. A petrol tin wicket, an old tennis or rubber ball, and a bat chopped out of a bit of deal with the family chopper will form a good outfit for any young boy. Football, tennis, rounders are all good games, but do not in themselves constitute hobbies. They are games played in the mass, although, in some cases, they form the only pastimes some young people know.

The writer's advice to young people is "Adopt some form of hobby that makes an appeal to you. There is such a variety of useful pastimes young folk can take up. If you tire of one there may be others at hand more interesting. Fill in your time of leisure on the lines suggested, and not only will you gain something of profit to yourself, but will develop habits of industry and concentration as well that will help in your future career."

[Papers Read at Conferences.]

THE CARE OF FARM MACHINERY.

[A. Scholz, Murraytown.]

Under the present conditions with wheat at a low price, one of the most serious problems the farmer of to-day is confronted with is the high cost of production. This cost can be reduced considerably by the care of farm machinery. Every implement on the farm costs money—hard earned money—and the initial cost is not the only expenditure to be considered. It is only after a farmer seriously considers whether he can afford it or not that he places his order for the machine he is in need of, and he most probably insures it against fire, but does he insure it against depreciation? He may do so for the first year or two, but when its shininess and paint work become dull, the machine is more or less neglected and the machine begins to rust. Rust is the cause of untold damage, and needless expenditure can easily be prevented without loss of time and by a modest outlay of money. Keep the oil from the crankcase of a motor, mix it with a little kerosene, or use it by itself, have a stiff paint brush, and paint all wood and ironwork with it freely, or a coat of boiled oil. This should be done prior to the use of the machine. Immediately the work of the machine is done for the year a coating of heavy oil to all wood and ironwork will prove to be of much benefit to it, and it is while doing this that all badly worn parts can be discovered, and should be replaced by new ones. The threads of all loose nuts should be covered with oil and the nuts tightened and covered with paint or oil, so that no time is lost the following season in undoing or cutting tight nuts if repairs are necessary. An hour spent in this way will save pounds of actual money and hours of time, which to a farmer are very valuable. How often does one see a machine left in the field rusting its life away? The maker of that machine guaranteed it to do certain work and to last, say, ten years with ordinary care. Without care and with the action of the elements on the ironwork, the machine will only last, say, seven or eight years, when a new machine will be necessary, thus greatly increasing the machinery bill on the farm. In many instances machinery that was scrapped in good times is now called on to render services again. The usefulness of any machine is shortened by neglect, such as bad lubrication, slack or missing bolts, loss of nuts, and wire instead of bolts. Wire may be all right for a makeshift, but not for a lasting job, and when replacing bolts, replace with ones of the correct size. Three of the most important points in connection with farm machinery are:—

1. *Use only the very best of lubricating oil and plenty of it,* remembering that it is cheaper to buy oil than new bearings.

2. *The Housing of Implements after use.*—All implements should be put under cover immediately after use, preferably under a galvanized iron roofed shed, enclosed on three sides either by galvanized iron or stone walls. Such a shed cannot be afforded in many cases, and a straw shed can be erected at a very low cost. A machine that is worked one month in the year and left standing under a tree for the remaining 11 months is damaged more during its idle period than during its working period.

3. *Common Sense on the Part of the Operator.*—At no time should the operator of the machine think that because the wheels are going around the machine is in sound working order; he should keep his eyes open and see that all cogs are in correct mesh and spindles running in true alignment, &c. Before starting the header at the beginning of harvest all oil cups should be cleaned out thoroughly, wicks placed in their right positions, and broken ones renewed. The cups can then be filled with kerosene; this will remove all gummy oil from the bearings and give fresh oil a good lead. During the working period of this machine there is always a day that the weather is unfit for reaping, and it is on such days that a farmer has the time to examine the machine and see that all nuts and bolts are tight, and all cogs in correct mesh. A cog meshed loosely will be very noisy and wear rapidly, while one that is meshed too tightly will give heavy running and throw undue strain on the bearings.

A little time spent in such a way not only adds longer life to the machine, but saves hours in good harvesting weather. When the machine is put in the shed after harvest, all belts should be given a dressing of neatsfoot oil to keep them pliable until next season.

The Combine.—In preparing the combine in readiness for seeding, tighten all loose nuts and bolts and put on a new set of shares; adjust strained tines, but if strained too badly replace them with new ones, so that all seed may be sown at an even depth. Oil wheat distributors and super star sockets; when this has been done, the combine is ready for seeding. Before starting each morning, be sure that the grain and fertiliser drives turn easily. When seeding operations are completed, clean all seed and super from the boxes and remove the rubber hoses. If these are washed clean of oil and super and put in the seed box until next season, they will last for many years. Remove super stars and soak them in water for a day so that they are free from all super, and then give them a coat of blacklead and put them back in the combine.

The Binder.—The binder is the machine that is used least of any machine on the farm, but while in use gives most trouble for the amount of work it does. This trouble can greatly be reduced with care. While the machine is in use, the canvasses should be slackened each night and tightened before starting to prevent them from stretching. Water should be poured on the knife two or three times a day, thus preventing it from becoming gummed, running stiff, and eventually breaking. Immediately the work of the machine has been completed for the year, the canvasses should be removed, rolled up, placed on the tray, and the machine placed in the shed.

Any engine that is used on the farm should be overhauled periodically, the cylinder head taken off, carbon removed, and valves ground.

All tools used on the farm should have their regular places in neatly made shelves in the blacksmith's shop, and after use returned to their places, so that they are close at hand when needed.

Neglect of machinery has meant the ruin of many a farmer, while the taking care of it leads to prosperity.

Mr. Scholz is one of the young members of the Bureau, and in the discussion that followed the reading of his paper, was sincerely congratulated on his excellent effort.

RIVER MURRAY BUREAU CONFERENCE, MOOROOK, 2nd JUNE.

GREEN MANURING.

[P. M. WILKSCH, Berri.]

My experiences in Green Manuring and the conclusions arrived therefrom are confined to the classes of soil with which I am acquainted—the Berri sand, Berri sandy loam, Barmera sandy loam, and Murray sand.

It is proposed to first deal with the planting and cultivation of the cover crop, and finally to endeavour to weigh up the advantages against the disadvantages of Green Manuring as compared with other methods of enriching and improving the land.

SEEDING.

Assuming that the cover crop is to be a leguminous one, I prefer to alternate the plants, using Beans one year and Peas the next. The end of March or beginning of April is the best time to sow, providing the soil is sufficiently moist, either from the last general irrigation or a fall of, say, 1in. of rain at that period. My practice is to cultivate twice after the irrigation, or to plough once with a 3-furrow plough (with the mouldboards removed) and then harrow. No further preparation of the seedbed is necessary. Broadcast the seed, for by this method the seed is distributed over a larger area than when a drill is used. When a wide drill is used there is danger

of canes being torn off by the wheels (when rows of vines are being sown) or the heavily-laden and wide-spreading branches of citrus trees being damaged in the same way. As a drill covers a space of only 5ft. 3in. in width, if alternate rows of citrus trees spaced 20ft. apart are sown, only one-eighth of each acre will be sown. This is not sufficient, as one wishes to obtain all the growth from the cover crop possible; therefore, broadcasting is the only safe method.

After the seed has been sown, the soil should be cultivated, then furrowed out (in preparation for a special light irrigation later on should such be necessary), then, finally, harrowed lightly. If this is done carefully with light harrows, it will not fill in the irrigation furrows. This preparation is necessary to keep the soil from setting and conserve moisture. The irrigation furrows are essential, for a later watering is almost certain to be required, and to resort to flooding the cover crop is most undesirable and likely to result in over-watering.

This was tried on one occasion and it took four times the ordinary stream to get the water moving at all, and at the end of 48 hours it had not travelled beyond 4 chains; the lower part of the row received no water at all. I have also tried the alternate method of planting, *i.e.*, of first sowing the seed, then furrowing out and watering, but in the class of land under discussion this had the effect of "setting" the soil, and in the event of a spell of dry weather following the green crop soon wilted and showed signs of distress.

QUANTITY OF SEED TO SOW.

In broadcasting, use a liberal quantity of seed; 5bush. of Beans to the acre sown, though when Peas are used a smaller quantity is sufficient.

FERTILISING THE COVER CROP.

When the farmer sows his crop of wheat he uses about 50lbs. of super per acre. As a rule, the practice is to use 5 and sometimes up to 10 times the quantity of super when putting in a cover crop. The young plants cannot avail themselves of one-quarter of the fertiliser sown, and it is therefore not only economically wasteful, but an actual detriment to the cover crop. Again, using the farmer as an illustration, it will have been noticed that where a temporary choke of the drill has occurred and in freeing it a comparatively large quantity of super has been spilled, the result has been that in that spot there has been a short period of rampant growth of the wheat plant, which, however, is not maintained, and by harvest time that patch will be comparatively a failure. A cover crop fares the same in similar conditions. Providing the vines or trees have been liberally manured during the previous season, there is sufficient fertiliser remaining to supply all that is required by the cover crop. In the unlikely event of no manure having been given to the trees or vines, then a dressing of about 1cwt. of super to the acre sown would be necessary for the cover crop.

TURNING UNDER.

For this the single-furrow plough with revolving coulter and drag-chain is favoured. A wide-tyred land-wheel will prove helpful in rolling down the strip for the next round. *By this method the crop can be put out of sight. Should the soil be too* dry for ploughing when the cover-crop has reached maturity, it is advisable to merely *disc the cover crop and plough later, but ploughing should be done not later than* the end of July in order to avoid damage to the young root growth.

THE CASE FOR AND AGAINST COVER CROPS.

It is generally admitted that a well-grown and luxuriant cover crop provides the cheapest and best method of providing nitrogen, keeps the soil in a good mechanical *condition, activates bacteria, and maintains a supply of the so necessary humus.* One might therefore think that these good results being so obvious, nothing could be *advanced against the general and universal growing of Green Manure; however, there* is another side to the picture. It has been assumed that the cover crop is to be planted *with the last general irrigation, provision being made for one light special*

irrigation later on. In years of good rainfall, this will usually result in a satisfactory growth, but in dry years, such as the present, it will be found that the cover crop will wilt and go off unless additional water is supplied, and this is the "catch" in it. There is the problem of a rising water table to be faced and anything which tends to aggravate this trouble is to be most carefully avoided. It is fairly well realised the amount of good which results from a successful cover crop, but the amount of harm which may easily result from over-watering is not so apparent, because this surplus water, which is soaking down and so raising the water table being "out of sight," is with many settlers also "out of mind." If, therefore, the settler has to deal with a soil which will not grow cover crops with the light irrigations beyond which it is not safe to venture, then he will be well advised to seek some other method of supplying humus, such as stable manure, old lucerne, leaf mould, &c., rather than run the risk of ruining his land (or some other man's through the too abundant use of water. One some soils, doubtless providing ordinary care is exercised, cover crops are in every way excellent, but on other classes of soils the reverse may be the case, and this aspect of the matter should be carefully kept in view.

THE ECONOMIC VALUE OF AUSTRALIAN BIRDS.

[S. Sanders, Jun., Moorook.]

Few primary producers think seriously or give consideration to the value of our native birds. They are unpaid workers, despised and illtreated by most men on the land. The Crow, one of the most useful birds, is slaughtered and harassed because people will not listen to common sense. They have a fixed prejudice against the Crow because they know little or nothing about its habits or value. The Crow is the greatest enemy of the blowfly, as most of the food of the Crow is blowfly larva. What would the farmer do without a scavenger in his paddocks during the lambing season? No pastoralist or farmer could do the work as efficiently or as well as the Crow. The argument will be advanced that the Crow kills lambs; no doubt he does, but never by his own aid; the lamb was a weakling and would naturally die and become food for the larva of the blowfly. The blowfly pest is reputed to be costing Australia £4,000,000 a year. The Crow does steal a few eggs from farmers, and for the good reason that the farmers do not collect the eggs as they should. Most people look upon the Magpie as a good and useful bird and it is given some protection, but the Crow is a more useful bird and should be wholly protected.

The Mud Lark or Peewit is of great value to stockbreeders and to the whole community. Fruitgrowers should give this bird every encouragement to frequent the orchards, as snails and worms are food for these birds. In swampy country the snails that live in the fresh waters are the host of the fluke. The fluke in the South-East of South Australia has caused some concern. Herons frequent waterholes, creeks, and swampy lands, and also destroy the host of the fluke. Most stockowners know the damage fluke does to sheep. Cuckoos are great workers. The Pallid Cuckoo is a migratory bird and appears when the large hairy caterpillars are about and helps to keep them in check. The little Bronze Cuckoo is found when the small green caterpillar is about, and will be found in numbers feeding on the small green insects that are attacking the grass or herbage. The little Blue Wrens are of great value to the orchardist as their food consists of insects. The value of the little Red-capped Robins cannot be estimated; they have several broods of young in a season, and the number of insects they consume is untold. A great number of small green caterpillars that attack apricot tree foliage and fruit are consumed by these little birds, which are always busy.

There are several small birds, called by most people Tomtits, of the Linnet family. They are to be found in most orchards devouring small insects and helping to keep pests in check. There is one very useful bird that happens to come along at the correct time—the White Shouldered Caterpillar Eater. There is a green caterpillar

that attacks lucerne at times and does a great deal of damage. The only food of these useful birds seems to be these caterpillars.

Quail are not very numerous along the river, but can be found in numbers at times. Where plentiful, they do a great deal to keep insect pests under control. The young of the Quail, between 6 and 14 in a brood, live on small insects and small seeds for a good part of their lives. The Sacred Kingfisher is a migratory bird and arrives just at the right time to be of great value to mankind and takes toll of a great number of caterpillars, especially worms.

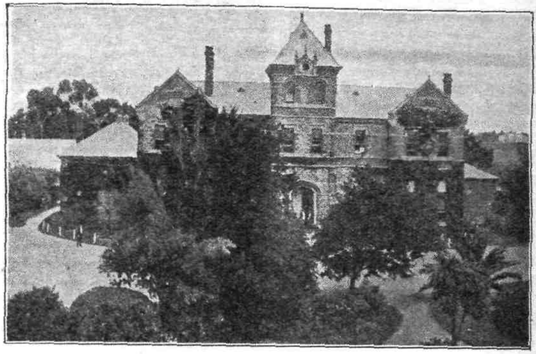
There are a great number of Hawks and Owls in South Australia. The Kestrel, often mistaken as an enemy, is an insect-eating bird, and is mistakenly called a Sparrow Hawk. The Owls keep up the battle with insects at night while other birds are resting. The House Swallow is one of the many birds that should be protected. Do not knock down the nests if they build under a verandah; place a piece of tin or iron under the nest to catch any droppings. It is estimated that a Swallow consumes about 2ozs. of insects a day, and these are all small flying insects. Small Bats should not be destroyed; they are enemies of the mosquito and live on small flying insects.

The large Wedge-tailed Eagle is being destroyed by thoughtless people. They are carrion-eaters and scavengers and help to clean up the filth that is left on pasture lands. They also clean up the offal that breeds the blowfly. Most of the native birds are of great economic value; they are unpaid workers which we cannot do without.

WHY IS THE CURRANT DETERIORATING?

[L. A. Chapple, Berri.]

It is not so much that the Currant has deteriorated as that the standard of packing is higher. This is to our credit. Still there are some things that can be attended to that will improve the quality of the Currants. Some soils produce better quality fruit than others, and it is always a well drained soil that produces the best fruit. It may vary from an old river silt bed to light sandy soil. Even the heavy red soils produce good Currants, but if the roots are oversupplied with water the growth of the vine is excessive and the fruit of inferior quality. This will often be the case at the top and bottom of the rows. Land that is affected with salt is not suitable for Currant growing, because the setting is affected, and the fruit produced will be small and not uniform. The growth on the Currant vine should be sturdy, but not wild, and anything that tends to produce such wild growth contributes to the lowering of the quality of the Currant, even though the crop is increased. An oversupply of nitrogenous manure is likely to bring about this effect, and for that reason it is probably the most difficult vine to which to apply manure. Much of the inferior quality of the Currant is brought about by faulty pruning. Sturdy growth is required to produce good bold fruit, and where weak spurs are left pruned to the same length as strong ones, the bunches produced from them must be of poorer quality. Nor is this the greatest fault in Currant pruning. Often every shoot that is produced is expected to carry fruit or is cut off so imperfectly as to cause weak, twiggy growth to spring from the base eyes that are left. Mr. A. V. Lyon, M.Sc. (Officer-in-charge Merbein Research Station) has proved that the quality of the Currant is improved by careful pruning and disbudding. Disbudding not only disposes of a lot of poor, weak bunches, but if practised for a few years the sap flow is more generally directed to the fruit spur. Care in picking will also improve the quality of Currants. In most It eyards there will be found patches that are ripe earlier than others; these should cheapesked out early and the fruit on the rack shaded. It does not pay to pick over condition, ither the fruit should all be picked or all be left. Fruit that is not ripe might therefoick early could be left, in most cases, until the Sultanas are finished. advanced againstften dragged from the racks long before they are ready, and placed is another side toun to dry, so that room can be made for the Sultana crop. Such planted with the mprove the quality of the fruit.



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ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on Wednesday, 31st July, there being present Messrs. A. J. Cooke (Chairman), R. H. Martin (Vice-Chairman) J. W. Sandford, Hon. A. L. McEwin, M.L.C., J. B. Murdoch, A. J. A. Koch, F. Coleman, P. J. Baily, H. N. Wicks, A. M. Dawkins, Geo. Jeffrey, Dr. A. E. V. Richardson, Professor A. J. Perkins, and H. C. Pritchard (Secretary).

An apology was received from Mr. S. Shepherd.

Election of Officers.—Mr. A. L. McEwin was elected Chairman and Mr. J. W. Sandford Vice-Chairman for the ensuing 12 months.

Re-appointment of Members.—Messrs. R. H. Martin, Geo. Jeffrey, J. B. Murdoch, J. W. Sandford, S. Shepherd, Hon. A. L. McEwin, M.L.C., and Dr. A. E. V. Richardson, who retired by effluxion of time on 30th June, were re-appointed by the Honourable the Minister of Agriculture for a further period of two years. The Minister also gave approval for the re-appointment of Mr. A. J. A. Koch as from 1st July, 1934.

New Branches.—Approval was given for the formation of a Men's and a Women's Branch at Karte, with the following as foundation members:—Men's Branch: C. G. Huckel, C. O. Patrick, H. W., C. B., and G. H. Trowbridge, C. H., E., G., and C. Atze, R. O. and C. W. Phillis, E. V., P. L., and B. J. Button, E. A. Huckel, I. A. Angus, E. B., L. M., and K. E. Franklin, H. G. R. Gould, D., D. C., and D. R Freeman, A. H. Gum, A. M. Mason, M. E. Small, L. H. Frost, A. A. Bierwirth, D. R. F. Flavel, A. Mattschoss, L. Inglis, jun., F. Gregory, G. Furniss, C. W. Gum, A. L. Small, and D. Bierwirth. Women's Branch: Mrs. H. W. Trowbridge, Misses E. and D. Trowbridge, Mrs. A. Matschoss, Mrs. R. O. Phillis, Mrs. P. I. Button, Miss P. Button, Mrs. D. R. Flavel, Miss B. Flavel, Mrs A. H. Gum, Miss Avis Gum, Mrs. A. A. Bierwirth, Miss F. Bierwirth, Mrs. H. Gould, Mrs. — Inglis, Mrs. C. Inglis, Mrs. C. Furniss, Mrs. E. N. Atze, Miss E. Atze, Miss G. Fiebig, Miss M. Button, Mrs. E. B. Franklin, Mrs. C. G. Huckel, Misses J. and T. Huckel, Mrs. D. R. Freeman, Mrs. L. Small, Miss E. Small, Mrs. — Russell, Miss — Angus, Mrs. C. W. Gum.

New Members.—The following names were approved for addition to the rolls of existing Branches:—Arthurton—V. W. Rudd, Clinton Tribbeck, M. T. Hynes; Balaklava—B. Robinson, Clifford March; Balhannah Women's—Miss — Miller, Berri—W. H. Wilksch; Booleroo Centre—W. A. Mills, C. Patterson, W. Whibley, V. G. Whibley, R. W. Reichstein, T. H. Reichstein, J. J. McCarthy, W. Sismey, J. B. Heddle, A. H. Schmaal, R. W. Noblet; Brentwood—E. E. M. Twartz, J. J. Honner, A. T. Symonds; Brinkley—Joe M. Jones, Elliot Jones, Edgar Schubert; Chapman Bore—H. C. Price, W. A. Taylor, Dudley Krollig, G. H. Burbridge, J. I. Ellis; Clare Women's—Mrs. N. M. Penfold, Mrs. G. Victorsen, Mrs. C. A. Masters, Mrs. R. Michael; Coonalpyn—R. J. and A. T. Schottelius, William Barrie, C. Coles, H. Mincham, C. Limbert, C. Leonard, G. E. and E. W. Venning, Brice Russell; Cungena—Malcolm, Donald R., and S. H. Bennie, Murray Dickson; Echunga—Edgar Braendler; Jamestown—W. C. Glasson, James Gilfillan, M. W. Bailey, Norman Jamieson, J. Rundle, A. D. Mitchell; Kanni—W. T. Fudge, A. A. Koch, F. A. Hoad, R. T. Graetz, E. H. Schulze, J. Platten, jun., W. Gregory, H. A. Pobke; Kelly—V. E. Ball, L. L. Veinke, F J. Newman; Lameroo—Arthur H. Worsley; Lenswood and Forest Range, C. Mason, J. R. Shaw, C. Schultz; Maltee Women's—Miss R. Talbot, Miss D. Moody; Minnipa—L. Jefferson; Morchard—Gordon Irvine, Mervyn Twigden; Morchard Women's—Miss Laurel Davill, Misses Daphne, Ronda, and Edna Twigden; Mount Pleasant—C. M. Watson, D. Hobbs, W. Kubank, J. Staples, W. K. and F. V. Johns, R. Simmons, W. F. Holmes, L. R. Harding, A. L. and Reg. Starkey, E. H. Buckley, M. H. Tapscott, E. R. Wegener, C. E.

Boyce, Ross Hobbs, E. R. Staples, A. N. Meakins; Mudamuckla Women's—Miss Laurel Burner; Narridy—O. Smart, O. G. Roberts; Narridy Women's—Misses L. and V. Roberts, Mrs. E. A. Darley, Mrs. R. S. Darley, Mrs. C. Cox, Mrs. C. Duel, Miss E. Griffin, Miss E. O'Shaughnessy, Miss E. Cox, Miss E. Thredgold; Owen—D. J. Wilson, I. Williams; Paskeville—M. E. Bussenschutt; Pygery Women's—Mrs. E. N. Heath, Miss Isobel Heath, Mrs. E. Bean, Miss Amelia Bean, Mrs. R. W. Woodrup; Redhill—M. Murphy, J. Tieste; Rosedale—A. G. Muegge, M. Muegge; J. Ruediger; Saddleworth Women's—Mrs. C. H. Behn; Sandalwood—A. G. W. Grant, E. Jennings; Sheoak Log Women's—Miss Marjorie Wehr; Snowtown—G. S. Freebairn, C. R. Wills; Snowtown Women's—Mrs. A. M. Robinson; South Kilkerran—W. G. Hasting, E. H. R. Dutschke, A. Bittner; Stockport—H. C. Clayton, A. Stevens, F., L., R., and E. Koch; Taragoro—A. H. G. Price, Vincent Price, Wm. Thredgold, Joseph Edwards; Tarlee—W. B. Kelly, L. Molineux; Warcowie—A. E. S. Dunstan; Warramboo Women's—Miss Laurel Chilman; Weavers—K. H. Giles, A. Farrow; Whitwarta—O. A. Ruediger, L., G., and B. Moldenhauer, F. Davies, H. R. Clark.

Branches to be Closed.—It was decided to close the Coulta, Bowhill, and Edillilie Branches through lack of interest.

Life Membership.—Approval was given for the appointment of the following persons as Life Members:—Messrs. S. V. Beckman, Parilla Well; W. J. Hammond, Taplan; H. Howard and T. B. Ness, Milang; and R. L. Myers, Mount Hope.

Several items were taken in Committee.

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IMPORTS AND EXPORTS OF FRUITS, PLANTS, ETC., DURING MAY AND JUNE, 1935.

IMPORTS.

Interstate.

	May.	June.
Apples (bushels)	1,084	635
Apples, Custard (bushels)	26½	8½
Bananas (bushels)	19,089	13,924½
Citrus—		
Grape Fruit (bushels)	61	23
Lemons (bushel)	1	—
Oranges (bushels)	77	5
Passion Fruit (bushels)	348	302
Paw Paws (bushels)	—	8
Pears (bushels)	—	14
Pineapples (bushels)	986	700½
Tomatoes (bushels)	1,160	—
Nuts—		
Chestnuts (bushel)	1	—
Cocoanuts (bags)	3	1
Peanuts (bags)	205	195
Peanut Kernels (bags)	60	142
Walnuts (bag)	—	1
Ginger (bushels)	3	—
Asparagus (packages)	2	2
Beans (bags)	7	180
Potatoes (bags)	2,946	5,998
Potatoes, Sweet (bushels)	19	11
Rhubarb (packages)	2	2

	May.	June.
Swedes (bags)	5	50
Bulbs (packages)	36	36
Plants, ornamental (pkgs.)	125	123
Roots, grass (bag)	1	—
Seeds (packages)	47	44
Trees, Fruit (packages)	18	54
Trees, ornamental (pkgs.)	10	12
Wine Casks (No.)	2,677	3,054
Fumigated—		
Citrus, oranges (bushels)	40	—
Plants, ornamental (pkgs.)	40	—
Trees, Fruit (packages)	18	39
Trees, ornamental (pkgs.)	8	4
Wine Casks (No.)	20	11
Rejected—		
Bananas (bushels)	12	27
Citrus, Grape Fruit (bushel)	1	—
Tomatoes (bushels)	15	—
Beans (bag)	1	—
Potatoes (bags)	160	—
Second-hand case (No.)	1	—

Overseas.

(State Law.)

	May.	June.
Wine Casks (No.)	908	1,560
Fumigated—Wine Casks (No.)	90	—

Federal Quarantine Act.

	Packages.	lbs.	Packages.	lbs.
Seeds, &c.	5,114	889,270	1,242	141,272
Canes	227	—	71	—
Cocoanut Chests	810	—	323	—
Tea Chests	1,174	—	1,805	—
Fibre	257	90,477	432	172,135
Plants	2	83 (No.)	—	—
Timber	224,120	3,794,117 sup. ft.	143,355	3,742,116 sup. ft.

EXPORTS.

Federal Commerce Act.

		May. Packages.	June. Packages.
England	Apples	22,299	4,418
	Citrus— Oranges	—	20,333
	Pears	751	—
France	Citrus— Oranges	—	8
Germany	Citrus— Oranges	—	9
India	Apples	2,768	1,702
	Citrus— Oranges	45	121
	Pears	30	—
	†Vegetables	82	27
Netherlands	Apples	645	579
East Indies	Citrus— Oranges	—	28
	†Vegetables	11	51
New Zealand	Citrus— Oranges	—	16,962
	Plants	2	15
	Seeds	48	—
Scotland	Citrus— Oranges	—	4,346
Singapore	Apples	44	—
	Citrus— Lemons	15	15
	Oranges	—	20
	Pears	166	195
	†Vegetables	148	117
Straits Settlements	Apples	100	—
	Potatoes	—	10
	†Vegetables	8	13

† Excluding potatoes.

DAIRY AND FARM PRODUCE MARKETS.

Messrs. A. W. SANDFORD & Co. LIMITED *reported on 2nd August*:—

BUTTER.—Conditions in South Australia through July were, generally speaking, satisfactory, but in the Northern areas and in the Mallee districts rain is still badly needed. Cream supplies increased each week during the month, but this was from the Hills and South-Eastern districts. It is pleasing to report that the London market steadily improved, and at date of report spot price for Australian choicest Kangaroo butter was 93s. per cwt. Local demand was well maintained and rates were unaltered, being:—Choicest creamery fresh butter in bulk, 1s. 2¾d.; prints and delivery extra. (This price is for local sale only and under the quota system the equalised price manufacturers will receive will be 12.3125d. per lb., on which basis payments to cream suppliers will be calculated.) Separator lines, from 8d. to 11½d. per lb. for choicest. Stores, 6d. to 8d. per lb. (these prices are subject to equalization levies).

CHEESE.—Milk supplies received by the factories in the Mount Gambier district increased each week and the outlook for the season is more promising than it has been for many years past. Apart from supplying the local and Westralian markets, exporting to Britain is now proceeding and record quantities, it is expected, will be shipped. Rates are:—Large and medium, from 9½d. per lb.; loaf, from 10d. per lb. at store door, delivery extra. Semi-matured, 11d. to 11½d. per lb.

EGGS.—A very sudden increase in the supplies took place at the latter end of July and exporting, which had been temporarily suspended, was then resumed in earnest. It was therefore necessary to adjust prices to export parity and present rates are:—Ordinary country eggs, fair average quality, 7½d. per dozen net; long distance rail or shipping eggs lower. Selected new laid clean eggs, full-sized, 10d. to 11d. per dozen net.

BACON.—Manufacturers kept the markets well supplied with bacon and steady winter trade has been maintained at:—Best quality sides, 9½d. to 9¾d. per lb.; middles, 10½d. to 11d.; heavy middles, 9d. to 9½d.; rolls, 8d. to 8½d.; hams, 1s. 1d. to 1s. 2d.; cooked, 1s. 2d. to 1s 4d per lb

ALMONDS.—Supplies received were barely sufficient to meet all trade requirements, and heavier quantities could have been placed. Values, however, have remained steady at:—Softshells and Brandis, 8½d. to 9½d. per lb.; hardshells, 5d. to 5½d.; kernels, 1s. 9½d. to 1s. 10½d. per lb.

HONEY.—Unfortunately there is no improvement to report in the selling market, and very heavy stocks are still held by merchants. Quotations are:—Prime quality clear extracted, 2½d. to 2¾d. per lb.; lower grades, 1d. to 2d. per lb.

BEESWAX met with strong demand at quotations:—1s. 4d. to 1s. 4½d. per lb. according to quality.

POTATOES.—New season's, 14s. per cwt.

ONIONS.—Brown Spanish, 12s. per cwt.

LIVE POULTRY.—Auction sales are held every Tuesday, Wednesday, Thursday, and Friday at our sale rooms, which are in every way the best equipped in South Australia. Supplies during the last few weeks showed improvement, and, where the birds were in good condition, a firming in prices was recorded. There was, however, a good demand for all grades. We advise consigning. Crates loaned free on application. The following are prices realised:—Prime roosters, 3s. to 4s.; nice-conditioned cockerels, 2s. 6d. to 2s. 11d.; fair-conditioned cockerels, 2s. to 2s. 5d.; chickens lower. Heavyweight hens, 2s. 5d. to 3s.; medium hens, 2s. to 2s. 4d.; light hens, 1s. 7d. to 1s. 11d.; couple of pens of weedy sorts lower. Prime young Muscovy drakes, 3s. to 4s.; young Muscovy ducks, 2s. to 2s. 8d.; ordinary ducks, 1s. 3d. to 2s.; ducklings lower. Geese, 2s. 6d. to 3s. 6d.; goslings lower. Turkeys, good to prime condition, 7d. to 8d. per lb. live weight; do., fair condition, 5d. to 6½d. per lb. live weight; do., poor and crooked breasted lower. Pigeons, 5½d. each.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall at the subjoined stations for the month of and to the end of July, 1935, also the average precipitation for July, and the average annual rainfall.

Station.	For July, 1935.	Av'ge. for July.	To end July, 1935.	Av'ge. Annual Rainfall.
FAR NORTH AND UPPER NORTH.				
Oodnadatta	0·02	0·22	1·99	4·66
Marree	—	0·32	1·72	5·88
Farina	—	0·35	1·65	6·43
Copley	0·07	0·46	1·38	7·87
Beltana	0·04	0·55	1·43	8·48
Blinman	0·15	1·08	1·49	11·86
Hookina	0·07	1·17	1·98	11·25
Hawker	0·33	1·26	2·39	12·26
Wilson	0·25	1·20	2·55	11·79
Gordon	0·25	0·93	2·25	10·53
Quorn	0·47	1·43	2·83	13·22
Port Augusta	0·15	0·72	4·34	9·44
Bruce	0·18	0·94	2·56	9·87
Hammond	0·13	1·04	3·25	11·21
Wilmington	0·79	2·02	5·20	17·32
Willowie	0·41	1·27	4·06	12·25
Melrose	1·29	2·83	9 90	22·88
Booleroo Centre	0·71	1·61	5·56	15·21
Port Germein	0·44	1·14	5·77	12·53
Wirrabara	1·14	2·36	7·06	19·29
Appila	0·84	1·54	7·25	14·65
Cradock	0·21	0·97	2·17	10·82
Carrieton	0·53	1·25	3·56	12·23
Johnburg	0·37	0·94	2·53	10·58
Eurelia	0·28	1·26	2·71	12·79
Orroroo	0·64	1·32	4·05	13·20
Nackara	0·35	0·98	3·24	11 09
Black Rock	0·69	1·18	3·51	12·37
Oodlawirra	0·43	1·05	3·24	11·68
Peterborough	0·57	1·24	4·71	13·22
Yongala	0·86	1·45	5·88	14·44
NORTH-EAST.				
Yunta	0·07	0·58	2·71	8·55
Waukaringa	0·20	0·58	2·19	7·94
Mannahill	0·12	0·57	1·79	8·20
Cockburn	0·02	0·51	1·24	7·96
Broken Hill, N.S.W.	—	0·72	1·49	9·56
LOWER NORTH.				
Port Pirie	0·28	1·23	7·33	13·21
Port Broughton	0·43	1·51	8·63	13·88
Bute	1·39	1·91	7·59	15·44
Laura	1·00	2·03	8·77	17·95
Caltowie	0·51	1·76	6·95	16·74
Jamestown	0·95	2·02	7·80	17·69
Gladstone	0·62	1·80	8·14'	16·29
Crystal Brook	0·49	1·66	9·74	15·78
Georgetown	0·67	2·04	8·60	18·37
Narridy	0·76	1·68	8·08	15·82
Redhill	1·24	1·87	10·23	16·59
Spalding	0·89	2·06	8·61	18·88
Gu[illegible]	1·12	2·16	8·65	18·68
[illegible] Netherlan[illegible]	0·92	1·71	8·63	15·39
[illegible] East	0·75	1·73	7·98	15·38
[illegible] Indies	1·29	1·74	8·13	15·74

†Veg

Station.	For July, 1935.	Av'ge. for July.	To end July, 1935.	Av'ge. Annual Rainfall.
LOWER NORTH—*continued*.				
Brinkworth	1·13	1·71	8·88	15·82
Blyth	1·23	1·83	10·53	16·78
Clare	1·88	3·07	12·94	24·51
Mintaro	1·96	2·83	12·58	23·42
Watervale	1·90	3·13	14·81	26·80
Auburn	2·24	2·97	13·32	23·98
Hoyleton	1·06	1·93	9·39	17·33
Balaklava	0·99	1·67	7·54	15·46
Port Wakefield	0·98	1·34	7·37	12·94
Terowie	0·57	1·31	4·43	13·35
Yarcowie	0·82	1·39	5·39	13·59
Hallett	0·94	1·84	8·17	16·46
Mount Bryan	1·35	1·99	9·13	16·83
Kooringa	1·42	2·15	8·20	17·85
Farrell's Flat	1·74	2·14	9·33	18·61
WEST OF MURRAY RANGE.				
Manoora	1·91	2·11	10·33	18·92
Saddleworth	2·11	2·23	10·72	19·60
Marrabel	1·96	2·31	10·64	19·96
Riverton	2·30	2·39	12·18	20·81
Tarlee	1·75	1·94	8·95	18·10
Stockport	1·75	1·80	10·00	16·93
Hamley Bridge	1·47	1·77	8·78	16·54
Kapunda	1·47	2·30	8·55	19·79
Freeling	1·66	1·98	10·08	17·83
Greenock	1·98	2·49	10·93	21·53
Truro	1·67	2·32	9·19	19·89
Stockwell	1·98	2·32	10·07	20·13
Nuriootpa	2·42	2·47	12·56	20·72
Angaston	2·23	2·70	10·38	22·42
Tanunda	2·45	2·62	12·95	22·02
Lyndoch	2·51	2·96	12·48	23·40
Williamstown	2·78	3·65	13·57	27·77
ADELAIDE PLAINS.				
Owen	1·06	1·65	8·82	14·66
Mallala	1·47	1·81	7·54	16·56
Roseworthy	1·78	1·94	9·74	17·40
Gawler	2·20	2·18	9·66	18·91
Two Wells	2·39	1·81	11·94	15·75
Virginia	1·93	1·93	10·09	17·18
Smithfield	1·90	1·97	10·16	17·64
Salisbury	2·08	2·09	10·68	18·56
Adelaide	2·58	2·64	12·76	21·15
Glen Osmond	3·34	3·36	14·53	26·05
Magill	3·31	3·12	14·04	25·53
MOUNT LOFTY RANGES.				
Teatree Gully	3·27	3·17	15·19	27·20
Stirling West	7·75	6·21	31·04	47·08
Uraidla	6·15	5·89	15·65	44·19
Clarendon	4·16	4·23	18·81	23·88
Happy Val'y Res.	3·38	—	15·14	—
Morphett Vale	2·88	2·88	13·21	22·66
Noarlunga	2·79	2·69	12·39	20·37
Willunga	3·73	3·60	15·08	26·02
Aldinga	2·81	2·68	11·43	20·27

RAINFALL—*continued*.

Station.	For July, 1935.	Av'ge. for July.	To end July, 1935.	Av'ge. Annual Rainfall.
Mount Lofty Ranges—continued.				
Myponga	5·85	4·34	22·81	29·50
Inman Valley	5·15	—	19·67	—
Yankalilla	4·33	3·09	13·10	22·83
Mount Compass	5·95	—	—	—
Mount Pleasant	4·08	3·56	14·73	27·23
Birdwood	4·35	3·85	16·23	29·21
Gumeracha	4·92	4·25	18·75	33·41
Millbrook Res.	4·88	4·42	21·16	34·68
Tweedvale	6·61	4·91	22·43	35·99
Woodside	5·06	4·28	18·98	32·31
Ambleside	6·20	4·64	21·37	34·90
Nairne	4·32	3·68	16·25	28·22
Mount Barker	4·77	4·22	17·50	31·31
Echunga	4·69	4·20	19·95	33·30
Macclesfield	4·82	4·00	17·34	30·43
Meadows	5·63	4·72	20·45	36·16
Strathalbyn	2·84	2·49	10·28	19·31
Murray Fats and Valley				
Meningie	1·76	2·35	9·77	18·37
Milang	1·36	1·80	7·05	14·91
Langhorne's Ck.	1·81	1·71	8·06	14·87
Wellington	1·62	1·47	8·42	14·65
Tailem Bend	1·58	1·48	8·58	15·06
Murray Bridge	1·32	1·36	6·31	13·56
Callington	1·65	1·73	6·42	15·19
Mannum	1·10	1·13	5·91	11·49
Palmer	2·62	1·73	8·12	15·63
Sedan	1 33	1·17	4·82	12·11
Swan Reach	1·15	0·90	4·71	10·64
Blanchetown	0·75	0·89	3·90	11·01
Eudunda	1·96	1·86	9·79	17·17
Pt. Pass	2·01	1·84	9·46	—
Sutherlands	0·74	1·01	3·84	10·84
Morgan	0·42	0·70	3·39	9·17
Waikerie	0·54	0·70	4·17	9·65
Overland Corner	0·40	0·77	3·08	10·32
Loxton	0·67	0·93	3·90	11·54
Berri	0·87	0·81	4·93	10·17
Renmark	0·72	0·78	5·17	10·41
West of Spencer's Gulf				
Eucla	2·17	0·88	8·85	9·96
Nullarbor	1·03	0·96	5·18	8·81
Fowler's Bay	1·72	1·72	7·82	11·94
Penong	1·09	1·71	6·47	12·27
Koonibba	0·64	1·63	6·74	12·13
Denial Bay	0·77	1·54	5·88	11·36
Ceduna	0·82	1·30	6·47	10·16
Smoky Bay	0·82	1·54	6·28	10·53
Wirrulla	1·02	1·35	8·11	10·54
Streaky Bay	2·46	2·33	11·24	14·88
Chandada	1·44	1·98	8·13	—
Minnipa	1·57	1·82	8·01	14·06
Kyancutta	1·63	1·76	8·99	—
Talia	2·61	2·31	9·69	14·76
Port Elliston	1·91	2 63	11·59	16·54
Lock	2·12	2·24	9·81	16·52
Mount Hope	3·42	—	13·67	—
Yeelanna	2·90	2·50	13·14	15·94
Cummins	3·03	2·85	12·84	17·60
Port Lincoln	1·94	2·99	9·84	19·42
Tumby	2·23	1·95	8·30	14·12
Ungarra	2·56	2·42	10·38	16·85
Port Neill	1·57	1·51	7·36	13·09

Station.	For July, 1935.	Av'ge. for July.	To end July, 1935.	Av'ge. Annual Rainfall.
West of Spencer's Gulf—continued.				
Arno Bay	1·66	1·47	8·09	12·65
Rudall	1·55	1·61	8·96	12·64
Cleve	2·06	1·67	10·64	14·83
Cowell	0·45	1·02	4·83	11·07
Miltalie	1·03	1·36	9·11	13·67
Mangalo	1·26	1·56	7·90	13·91
Darke's Peak	1·90	1·78	10·46	15·18
Kimba	1·16	1·40	7·34	11·82
Yorke Peninsula.				
Wallaroo	0·80	1·57	8·47	13·98
Kadina	1·24	1·92	9·77	15·64
Moonta	1·36	1·84	8·10	15·06
Paskeville	1·32	1·87	8·06	15·49
Maitland	2·24	2·51	11·99	19·90
Ardrossan	1·81	1·54	8·00	13·97
Port Victoria	1·16	1·89	8·15	15·44
Curramulka	2·09	2·35	8·75	17·87
Minlaton	2·01	2·30	9·00	17·79
Port Vincent	1·64	1·70	6·76	14·43
Brentwood	2·07	2·04	9·38	15·55
Stansbury	2·92	2·18	8·89	16·82
Warooka	2·55	2·59	9·59	17·49
Yorketown	3·00	2·30	11·93	16·88
Edithburgh	3·07	2·13	9·61	16·37
South and South-East.				
Cape Borda	5·29	4·18	19·54	24·82
Kingscote	4·66	2·99	14·06	19·14
Penneshaw	3·02	2·95	11·89	18·92
Victor Harbour	2·97	2·93	12·31	21·37
Port Elliot	2·22	2·62	9·81	19·93
Goolwa	1·91	2·32	8·71	17·85
Maggea	0·94	0·91	4·64	10·04
Copeville	1·22	0·93	6·12	11·51
Claypans	1·13	0·94	5·15	10·38
Meribah	1·01	1·09	5·03	11·31
Alawoona	0·97	1·03	4·67	10·36
Caliph	0·77	0·87	4·37	—
Mindarie	1·12	1·08	5·18	12·21
Sandalwood	1·46	1·28	6·85	13·66
Karoonda	1·54	1·25	7·56	14·36
Pinnaroo	1·15	1·33	4·74	14·43
Parilla	1·50	1·31	6·44	13·82
Lameroo	1·61	1·60	6·77	15·97
Parrakie	1·88	1·41	8·89	14·62
Geranium	1·94	1·71	9·57	16·51
Peake	2·32	1·60	10·31	16·01
Cooke's Plains	1·44	1·65	8·62	15·30
Coomandook	1·73	1·99	9·42	17·09
Coonalpyn	2·15	2·09	10·84	17·61
Tintinara	2·46	2·16	11·45	18·71
Keith	3·15	2·08	10·90	17·92
Bordertown	3·15	2·[illegible]4	11·50	19·21
Wolseley	3·14	2·10	11·01	18·49
Frances	3·70	2·36	13·73	20·11
Naracoorte	3·78	2·77	15·59	22·66
Penola	3·64	3·27	15·24	26·01
Lucindale	4·77	3·26	18·61	23·34
Kingston	4·78	3·52	16·40	24·28
Robe	4·43	3·96	18·19	24·67
Beachport	5·90	4·43	20·17	27·09
Millicent	6·12	4·32	22·63	29·79
Kalangadoo	5·24	4·47	19·51	32·28
Mount Gambier	4·39	4·06	16·74	30·45

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page.	Dates of Meetings. Sept.	Dates of Meetings. Oct.
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Alawoona	*	—	—
Aldinga	*	—	—
Allandale East	144	12	10
Alma	*	—	—
Angaston	*	—	—
Appila-Yarrowie	144	6	4
Arthurton	*	—	—
Ashbourne	*	11	9
Auburn Women's	*	—	—
Balaklava	*	—	—
Balhannah	*	—	—
Balhannah Women's	*	18	16
Balumbah	145		
Balumbah Women's	160	4	2
Barmera	*	—	—
Baroota	144	2	14
Beetaloo Valley	144	9	7
Belalie Women's	160	10	8
Belvidere	*	—	—
Berri	—	9	7
Blackheath	145	19	17
Black Rock	144	—	—
Black Springs	144	10	8, 29
Blackwood	145	9	14
Block E	*	—	—
Blyth	144	27	25
Booborowie	*	9	7
Booleroo Centre	*	27	25
Boolgun	*	—	—
Boor's Plains	*130*	—	—
Boor's Plains Women's	—	—	—
Borrika	—	—	—
Bowhill	—	—	—
Brentwood	133, 145	2	7
Brinkley	*	11	9
Brinkworth	—	—	—
Brownlow	144	11	9
Buchanan	144	—	—
Bundaleer Springs	*	—	—
Bute	145	19	17
Butler	*	—	—
Calca	*	—	—
Caliph	*	3	1
Caralue	—	—	—
Carey's Gully	*	2	—
Carrow	—	—	—
Ceduna	—	—	—
Chandada	*	—	—
Chapman's Bore	145	16	14
Charra	*	—	—
Cherry Gardens	145	7	12
Chilpuddie Rock	*	—	—
Clare Women's	159, 160	—	—
Clarendon	*	9	7
Cleve	—	—	—
Collie	*	4	2
Coomandook	145	27	25
Coonalpyn	145	11	9
Coonalpyn Women's	*	—	—
Coonawarra	*	12	10
Coonawarra Women's	*	18	16
Cummins	*	13	11
Cungena	*	5	3
Currency Creek	*	16	14
Dudley	*	—	—
[illegible]nga	145	11	9
Netherla. Hill	—	—	—
East	—	—	—
Indies	144	14	12
†Veg[illegible]n's	*	4	2

Branch.	Report on Page.	Dates of Meetings. Sept.	Dates of Meetings. Oct.
Farrell's Flat	—	—	—
Finniss	*	—	—
Frances	*	—	—
Frayville	145	—	—
Gawler River	*	—	—
Georgetown	—	—	—
Geranium	—	—	—
Gladstone	144	13	11
Gladstone Women's	—	17	15
Glencoe	—	—	—
Goode	*	—	—
Goode Women's	*	—	—
Greenock	144	—	—
Green Patch	145	12	10
Gumeracha	*	16	14
Hanson	144	10	8
Hartley	145	11	9
Hindmarsh Island	*	—	—
Hope Forest	*	2	7
Hope Forest Women's	*	—	—
Hoyleton	—	—	—
Inman Valley	145	19	17
Jamestown	—	18	16
Jervois	*	12	10
Kalangadoo	*	14	12
Kalangadoo Women's	*	14	12
Kalyan	—	—	—
Kangarilla Women's	160	19	17
Kanni	*	—	—
Kapunda	—	—	—
Karoonda	—	—	—
Karte	*	—	—
Karte Women's	160	—	—
Keith	—	—	—
Kelly	127	7	5
Ki Ki	*	—	—
Kilkerran	*	12	10
Kongorong	—	—	—
Koolunga	*	—	—
Koonunga	144	—	—
Koppio	134	11	9
Kringin	—	—	—
Kulkawirra	*	10	8
Kyancutta	145	3	1
Kybybolite	*	12	10
Kybybolite Women's	160	—	—
Lameroo	145	7	12
Langhorne's Creek	—	—	—
Laura	*	14	12
Laura Bay	*	—	—
Laura Bay Women's	160	—	—
Lenswood and Forest Range	—	—	—
Light's Pass	*	—	—
Lipson	*	7	12
Lone Gum and Monash	*	19	17
Lone Pine	*	9	7
Longwood	145	—	—
Lowbank	—	—	—
Loxton	—	—	—
Lyndoch	*	10	8
MacGillivray	*	10	8
McLaren Flat	145	—	—
McLaren Flat Women's	160	5	3
Macclesfield	*	19	17
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Maltee	145	12	10
Maltee Women's	160	—	—

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Branch.	Report on Page.	Dates of Meetings.	
		Sept.	Oct.
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Marama	145	—	—
Meadows	—	—	—
Milang	*	14	12
Millicent	—	27	15
Millicent Women's	—	—	—
Miltalie	145	7	12
Minnipa	145	—	—
Monarto South	*	—	—
Monarto South Women's	160	21	19
Moorlands	*	11	9
Moorook	*	—	—
Morchard	144	13	11
Morchard Women's	160	25	23
Mount Barker	*	16	21
Mount Bryan	*	—	—
Mount Compass	*	—	—
Mount Gambier	144	13	11
Mount Hope	143	10	8
Mount Pleasant	*	11	9
Mudamuckla	*	14	12
Mudamuckla Women's	—	—	—
Mundalla	*	—	—
Mundalla Women's	*	12	10
Murray Bridge	*	—	—
Murraytown	144	—	—
Mypolonga	*	—	—
Myponga	*	19	17
Myrla	—	—	—
Nantawarra	*	12	10
Naracoorte	—	—	—
Narridy	*	—	—
Narridy Women's	160	—	—
Narrung	*	—	—
Nelshaby	129, 141	—	—
Nelshaby Women's	160	—	—
Netherton	—	—	—
Nunjikompita	*	12	10
Nunkeri	*	12	10
O'Loughlin	*	9	14
O'Loughlin Women's	160	—	—
Overland Corner	*	—	—
Owen	*	9	14
Palabie	*	—	—
Parilla	*	—	—
Parilla Women's	*	18	16
Parilla Well	*	16	14
Parilla Well Women's	*	24	29
Parrakie	*	—	—
Parrakie Women's	*	24	29
Paruna	—	—	—
Paskeville	145	10	8
Pata	144	—	—
Penola	—	7	5
Penola Women's	158, 160	—	—
Penwortham	144	11	9
Petersville	—	—	—
Petina	—	28	26
Pinbong	133	—	—
Pinkawillinnie	*	—	—
Pinnaroo	—	—	—
Pinnaroo Women's	—	13	11
Port Elliot	145	—	—
Pygery	145	10	8
Pygery Women's	*	—	—
Quorn	—	—	—
Ramco	145	9	7
Redhill	144	—	—
Rendelsham	144	7	12
Rendelsham Women's	160	4	—
Renmark	*	—	—
Riverton	*	9	14
Roberts and Verran	*	—	—
Rosedale	144	—	—
Roseworthy	*	—	—
Rudall	—	—	—
Saddleworth	*	13	11
Saddleworth Women's	—	3	1
Scott's Bottom	*	7	12
Sheoak Log Women's	160	—	—
Shoal Bay	145	10	8
Smoky Bay	*		
Snowtown	144	13	11
Snowtown Women's	160	5	3
South Kilkerran	128	2	7
Springton	—	4	2
Stanley Flat	*	16	21
Stockport	144	—	—
Strathalbyn	*	11	9
Streaky Bay	—	—	—
Sutherlands	*	5	3
Talia	—	—	—
Tantanoola	144	7	5
Tantanoola Women's	160	4	2
Taplan	*	*10*	8
Taplan Women's	159	—	—
Taragoro	131, 145	2	10
Tarlee	144	—	—
Tatiara	*	—	—
Tintinara	*	—	—
Truro	*	16	21
Tweedvale	*	19	17
Tweedvale Women's	*	16	21
Ungarra	—	—	—
Upper Wakefield	*	12	10
Waddikee Rocks	—	—	—
Waikerie	—	—	—
Wallala	*	11	9
Wanbi	—	—	—
Wandearah	144	10	8
Warcowie	136	10	8
Warcowie Women's	157	—	—
Warramboo	—	10	8
Warramboo Women's	—	—	—
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Watervale	*	*16*	21
Wauraltee	—	—	—
Weavers	135, 145	9	14
Wepowie	*	9	7
Wepowie Women's	*	—	—
Whitwarta	139	23	21
Wilkawatt Women's	*	17	15
Williamstown Women's	146	4	2
Willowie	*	23	28
Wilmington	144	17	15
Wilmington Women's	160	—	—
Wirrabara	*	—	—
Wirrabara *Women's*	160	—	—
Wirrilla	*	—	—
Wirrilla Women's	*	12	3
Wirrulla	—	—	—
Wolseley	144	9	14
Wudinna	*	—	—
Yadnarie	*	10	8
Yandiah	132	13	11
Yaninee	—	—	—
Yeelanna	*	11	9
Yundi	—	—	—
Yurgo	145	—	—
Yurgo Women's	158	—	—

* No report received during the month of July.

If dates do not appear above, Secretaries are requested to advise the General Secretary of details of Branch programmes, or of the regular night of meeting, *e.g.* 3rd Monday in month.

AGRICULTURAL BUREAU OF SOUTH AUSTRALIA

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the Secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the Department for fuller particulars concerning the work of this institution.

[The new Bureau subscription rate of 2s. per annum, which was recommended at the 1933 Congress, applies to all members as from August 1st, 1934, with the following exceptions:—Life Members, Branch Secretaries, and members who reside in the same house as (a) a Life Member, or (b) a Branch Secretary, or (c) a subscribing member. Subject to the foregoing exceptions, new members joining during the months of July to December will pay 2s. per annum, and those joining during the months of January to June 1s. for that period and 2s. for each succeeding year. Subscriptions must accompany the nomination forms unless the nominee is exempt.]

MEN'S BRANCHES.

SUBJECTS DISCUSSED AT BUREAU MEETINGS.

If you have no other subject in mind, here is a list from which you might choose when asked to contribute to your branch programme. The list has been compiled from published branch reports.

Agriculture.	Horticulture.	Livestock.	General.
Barley Growing.	Cincturing.	Calf Rearing.	Afforestation.
Harvest Reports.	Spraying.	Care of Farm Livestock.	Beekeeping.
Pasture Management.	Pruning.	Management of Horses.	Bird Pests.
Fallowing.	Orchard and Garden Pests.	The Brood Mare.	Blacksmithing.
Care of Machinery.	Fruit Drying.	Colt Breaking.	Book-keeping.
Control of Drift.	Drainage.	Shoeing Horses.	Preparations for Drought.
Fodder Crops.	Potatoes.	Sore Shoulders.	Ensilage.
Haymaking.	Tomato Culture.	Weaning Foals.	Labor Saving Hints.
Crop Rotation.	Vegetable Growing.	Lamb Marking.	Fencing.
Seeding Operations.	Citrus Culture.	Sheep Management.	Fodder Conservation.
Wheat Pickling.	Packing and Grading Fruit.	Wool Classing.	Vermin Destruction.
Wheat Diseases.	Budding and Grafting.	Shearing.	Care of Hides and Skins.
Wheat Varieties for the District.	Orchard Cultivation.	Sheep Dipping.	Farm Insurance.
Seed Wheat.	Rack Building.	Fat Lambs.	Tank Building.
Value of the Oat Crop.	Fruit Preserving.	Handfeeding Sheep.	Shed Construction.
Wheats for Milling.	Irrigation.	Poultry.	Farm Conveniences.
Peas.	Seepage.	Shelter for Livestock.	Concrete on the Farm
Wheat *v.* Sheep.	Care of Orchard Equipment.	Management of the Dairy Cow.	Dam Sinking.
Wheat Varieties for Hay.	Farm Garden.	Care of the Breeding Ewe.	Scrub Farm Operatio
Crop Competitions.	Diseases of the Vine.	Pigbreeding and Management.	Farm Sidelines.
Harvest Operations.	Manures for the Orchard.	Ailments and Diseases of Farm Stock.	Bacon Curing.
Value of Agricultural Experiments.	Fruit Tree Diseases.	Sheep *v.* Wheat.	Value of Native Bird
Cultivation.	Planting the Orchard.	Rearing Turkeys.	Noxious Weeds.
Fertilisers and Manures.	Frost Prevention.	Horse Breeding.	The Agricultural Bureau.
Cultivator *v.* Plough for Fallowing.	Fumigation for Scale Insects.	Herd Testing.	Handling Dairy Produce.
[illegible]co Culture		Rams for Farm Flocks.	Farm Buildings.
[illegible]ng Hay.			Layout of the Farm.
[illegible]he Past			Firefighting.
			Lowering Costs of Pr duction.
			Farm Records.
			Subdivision of the Farm.

Netherla. Hi East Indies †Ve

THE MILLING QUALITIES OF WHEATS.

The above was the subject of a paper by Mr. F. K. Parsons read at a meeting of Kelly Agricultural Bureau on 6th July, 1935, at which 26 members and visitors were resent:—

Flour strength may be defined as the capacity of a flour for yielding a loaf f easily digestible bread, light and even in texture, composed of a network of niform small holes, large in volume, well and evenly piled. A weak flour may nake bread that will scarcely rise at all, a loaf flat, sodden, hard, indigestible and nmarketable.

During the process of baking the following, roughly, takes place:—Yeast feeds pon the sugar of the flour and multiplies, forming minute bubbles of carbon ioxide (CO_2) and small quantities of alcohol. The carbon dioxide and alcohol expand apidly with heat.

The gluten and flour stretch like fine rubber and give the characteristic of the loaf. trong flour wheats are generally high in gluten content, are hard, translucent, thinkinned, and the flour absorbs more water than weak flour to bring it to the consistency f dough. Weak flour wheats are opaque, soft, mealy when crushed, low in gluten nd water absorbtion.

Common Tests for Strength of Wheat for Flour:—

A. Translucent and hard grain.—By light and by biting.

B. Chewing test.—By chewing a few grains, the flour and bran can be dissolved, nd the gluten is left. Thus the gluten can be roughly estimated. It resembles hewing gum or rubber.

C. The Pelshenke or Wholemeal Fermentation Test.—This test consists of grinding a ew grains of wheat. To this wholemeal is added a 10 per cent. solution of yeast. his is mixed into a ball and placed in water at 31° C. The ball sinks; as gas is volved by the action of yeast, it rises and expands, finally ruptures, and falls to the ottom. The time in minutes from when the ball was placed in water until it breaks is nown as the Pelshenke test figure. The higher the figure the better the flour. This st is not strictly reliable. It is used by plant breeders mainly in eliminating weak oured wheats. The most definite test is by baking. Given quantities of flour are ixed and baked under similar conditions. The weight and volume of the loaves are easured, and the baking score, determined by marks, awarded for general appearance, olour of crumb, flavour, texture, and pile.

The reasons for so much prominence being given of late to quality in wheat are many. n an analysis of the Adelaide Show wheats of 1934 the Department of Chemistry ublished some figures. Two examples are quoted: Florence, a medium-floured; and allipoli, a weak-floured wheat:—

	Baking Score, Total 90 Marks.	Pelshenke Test No.	Vol.	Weight of Loaf.	No. of Loaves per Ton Flour, 14% Moisture.
Florence	42	76	390	136.9	1,369
Gallipoli	31	27	330	126.2	1,262
			60		107

Not only does Florence yield more loaves per ton but they are bigger and have a uch better appearance than Gallipoli. Local millers take approximately one-fifth of e total Australian production, or 31,000,000bush. They are universally demanding tter quality wheat. Some are giving up to 10d. per bushel more (in Western Ausalia) for desirable varieties.

The Export Trade.—A steady rise in the amount of export flour is taking place. his will be a valuable means of selling South Australian wheat, especially with the ast. The U.S.A. and Canadian wheats are high in gluten. Flour of poor and varying ality is of no use on Eastern markets. The demand is there for Australian wheat d growers should endeavour to give them high gluten and good quality wheat. Egypt s passed legislation that all imported flour should have at least 12 per cent. gluten. ustralian wheat is no longer in such strong demand for blending on account of its illiant colour and dryness as this can be achieved by bleaching. In certain countries, e., Tasmania, weak flour wheats can only be grown. These are very late in maturing d have soft, mealy grain. The flour is used for the biscuit and pastry trade. echanical mixing of dough is now universally accepted, and better quality is necessary stand up to this mixing.

To Increase Flour Strength.—There are roughly three ways by which this can be done -(*a*) grow high flour strength wheats; (*b*) cross present wheats with strong flour heats; and (*c*) select strong wheats from varieties that are good yielders, but have t been definitely fixed. The strong flour wheats are said to be lower yielding than

weak flour wheat. However, at Roseworthy in 1928 Florence beat Nabawa by over 1bush. of wheat and 6cwts. of hay per acre. Better floured wheats, as decided by the Pelshenke test, that may suit this district are—Aussie 117, Felix 92, Florence 86, Ford, Sword (irregular test), Merredin, and Ranee.

Crossing wheats to produce quality and yield will be a difficult and hazardous operation. It will also take a long time. The possibility of selecting for quality within a variety that is showing morphological variations such as Sword, Ford, and Nabawa seems hopeful. Ninety consecutive single plants of Sword, Ford, and Nabawa were harvested from pure seed rows. Plants were threshed in a single plant thresher, and the Pelshenke test was used to assess the baking quality of each single plant.

Nabawa.—The majority of plants gave figures between 28-66 minutes, average 40. However, two samples gave test figures of 90 and 132 minutes, and in doing so exhibited all the characters of a strong wheat.

Sword.—Plants ranged from 32 to 72 minutes, with an average of 46. Samples with a test figure of more than 50 minutes generally exhibited all the characters of a wheat of medium strength. It is unlikely that a variation of this magnitude would be shown by a pure line. It is interesting to note that the lowest and highest figures of plants of this variety—viz., 32 and 72—are similar to the test figure given by the parents of Sword, namely, Sultan and Ford.

Ford.—Plants from a pure seed row ranged from 42 to 80, average 60.

All States in Australia and Argentine, also in Europe, are trying to improve the baking quality of their wheat. In Western Australia the area under Gluclub was 300,000 acres. The Department is doing its best to discourage farmers from growing it.

In a paper read at the Lower North Conference, Mr. Marshman said:—"The President of Federal Millers' Association of the Victorian Wheatgrowers Co-operative Limited complained bitterly of the low quality wheat. They said it was really unsalable in British markets." Also a Melbourne bank manager said "We are up against trouble with wheat quality following denouncement by the millers of 'Free Gallipoli' wheat for milling purposes. The matter is really a serious one, and millers next year may decline to buy Free Gallipoli, and may pay 6d. per bushel below normal for it."

In wheat breeding, varieties are being discarded that do not show sufficient quality, no matter what yielding ability they possess. The varieties that are the worst offenders are Free Gallipoli, Nabawa, Gluclub, Early Gluyas, Waratah, Ghurka, and Penny; also many others that don't interest us. There is no need for growers to be stampeded into sowing untried varieties. Australian wheats are not greatly below world standards. (Secretary, F. R. Illman.)

SELECTION AND CARE OF WHEAT.

At a meeting of the South Kilkerran Branch on 1st July, Mr. E. F. Heinrich read the following paper, entitled "Selection and Care of Wheat."

Taking selection firstly, seed selected should suit the class of land in which it is to be sown. For feed purposes, the type of seed sown should be selected to suit the locality, and care should be taken even in these lines.

Types of wheat which "go down" are more or less unsuitable for heavy, wet soils, and wheats which are suitable for these soils are very often unsuitable for lighter land. For example, a paddock which is low-lying or heavy should not be sown with a wheat such as "King's White." A seed like this might yield well, but if a wet season is encountered the yield in money, if not in grain, is greatly reduced by the difficulty met with in reaping.

To a certain degree most wheats which thrive on heavy land, also rank amongst the best yielders on light soils. When procuring fresh seed from some other source, select from a crop which is not contaminated with barley or with weeds which are difficult to eradicate from the seed—either in reaping or in subsequent cleaning for drilling. Most weeds, and even barley, by the careful use of a suitable grader and separator can be culled from seed wheats, leaving it comparatively free from anything but the true grain. The presence of foreign wheats is an even worse evil, as these cannot be culled by grading, or—up to date—by anything short of hand picking, which is very slow, tedious, and expensive. It might also be added here that wheats of poor milling quality will have to be dropped if we wish to keep the quality of Australian wheats up to standard. The names of some of these wheats appeared in a recent daily paper. A step in the right direction has been taken by the millers in offering a prize for crops excluding those of poor milling qualities.

Further steps will have to be taken by legislation on price ruling to reduce the quantity of these wheats sown, as some of them, whilst they bring the same price as wheats of better milling quality, are profitable yielders.

Passing on to barley and oats, these also need selection. Owing to the efforts of the Bureau, coupled with the aid of interested farmers, we now have a very good type of barley seed—the Challenger Early, which is still comparatively free of Cape or other foreigners. This seed seems admirably suited to both maltsters and growers. Oats also repay selection, both for type suited to different conditions of land and for purity. Very seldom is seen a crop of oats free of Cape Barley and it would seem that to get pure oaten seed one would have to hand-pick a small plot and take pains in reaping so as to keep it pure.

When pure seed of a desirable type is unprocurable the thing to do is to hand-pick a strip of harvester width, or more if desired, and sow the results the following year with seed saved from the same variety, but separately or marked or in the centre of the piece, the result of that being saved for seed, again hand-picking a strip or more to purify that which will be reaped for seed the following year. A year or two of this will result in a pure type. Too much cannot be said about the care of the seed. Most varieties of seed should be pickled thoroughly to prevent smut, either by dry pickle (in wheat) or by a suitable solution such as formalin or blue stone of the correct strength. The strength recommended by the makers of the pickle is fairly accurate and should be adhered to with discretion. In using dry pickle, an effective pickler, which thoroughly dusts every grain should be used. For wet pickling use a method and quantity which thoroughly wets every grain. With one make of wet pickler on the market, every grain must drop through the water into a submerged worm which churns the grain up through the water into the bag. This is an ideal method, as if a grain is not thoroughly moistened on the surface it cannot drop to the elevating worm, and hence there are no dry spots left on the grain.

Too much care cannot be exercised in the pickling of barley, which is very subject to smut. Care amounting almost to fastidiousness should be exercised in cleaning the drill or combine when changing from one variety of seed to another. Every possible grain of the previously sown wheat should be removed both from the outside and the inside of the grain box before starting the next variety. Care should also be taken to keep grain from entering the fertilizing box, as this might stay in there indefinitely, and so contaminate the subsequent seed. In cleaning the grain box all grains near the top should be scratched into the cups, which should be then turned out by hand or run out over the plot just finished. There is always some grain which works into the closed cup as well as into the crevices between the two cups in which the lids fit (or misfit). These should all be scratched into the bottom of the cups before the final running or turning out.

Is it not well worth while spending the necessary small amount of time in this cleaning, and so keep the varieties pure? Combine and drill manufacturers could help a great deal in this matter by making the grain box a good deal easier to clean, and making the lids of the respective boxes so that they will not leak grain either over the frame and sections where the grain can lodge, or into the fertilizer box.

When reaping, harvesting machinery should be cleaned externally of other grain some time before the seed is to be saved. The machine, just before the saving of seed should be run some distance empty, with the bottom of the elevators opened. The grain box should be then well cleaned of all grain, and subsequent seed saved should be put in clean bags, not essentially new. Care should be taken that bag sowers do not take left-over butts from another kind of wheat, or even from the first heaps of the piece to the seed heaps.

Seed bags should be carefully marked when carted in, and again after cleaning. Grader, winnowers, &c., cannot be too carefully cleaned at the finish of each variety. It would be almost impossible to exercise too much care with seed, from the cleaning of seed until reaping of same for the following year, and it is this care that makes for clean, well-kept varieties of grain. (Secretary, R. E. Hasting.)

CULTIVATION FOR WHEATGROWING.

The above was the subject of a paper read by Mr. D. R. Wright at the monthly meeting of the Nelshaby Branch on 25th April. He advised commencing the fallowing early in June, and finishing before the end of July. Ploughing not more than 4in. deep had proved successful of late years, but in wet seasons a deep stirring would be of advantage. Deep working was only of use if done early, so if fallowing late in the season shallow working was advisable. Although the district was outside of "Goyder's Line of Rainfall," the lighter soils received an ample average rainfall for wheatgrowing requirements. Conservation of moisture was certainly necessary to bring fallows to a good mechanical condition, but with the local self-mulching soils it was not so important as the clearing of the fallows and the firming of the underlayers. Land ploughed and left uncultivated until after harvest was not fallow, although some farmers believed it was so. Frequent working with the harrows or tyned implements

should be given at opportune times to kill weeds and to compact the seedbed. Disc implements, except for fallowing, were not conducive to good cultivation, because the soil was left too open and loose. There was no better implement than the combine drill; it cultivated and firmed the seedbed, and could be set to do a good job at a shallow depth. The use of a roller or culti-packer would be of advantage, especially where frequent cultivation could not be given to the fallow; wherever land was consolidated a better crop was always noticeable. Every working of the land paid for itself, and the farmer who gave his fallow from 5 to 6 workings in a year would find wheatgrowing a much more profitable proposition than the man who fallowed his land late and worked it little. (Secretary, J. A. Lawrie.)

SEEDING AND TYPES OF MACHINES.

Mr. H. B. East, in the course of a paper read at a meeting of the Boors Plains Branch on 6th June, said:—

The first object in fallowing should be to plough the field to a depth suitable for the soil in the district. Ploughing does two things; it not only breaks up the soil for finer tilling operations, it also breaks up those millions of capillary tubes so to speak, prevents the capillary action of moisture coming to the surface and being absorbed by the sun. Having stopped this capillary action it is now necessary to keep working the top soil in order to prevent the capillary action from reinstating itself. Two benefits are obtained from keeping the top soil in a fine tilth; the first is that this fine soil is like placing a bag or blanket over the capillary tubes preventing the sun from evaporating the moisture; the other benefit is that the dryness of the top surface tilth is attracting or drawing the moisture towards itself and thereby keeping the seedbed more damp than would be otherwise the case; or in other words it counter attracts the moisture going down into the earth or what is known as the process of percolation. Now these subsequent workings are of the utmost importance, as it is by working back the fallow after rain that we conserve the moisture to the point which is later to become the seedbed of the plant to be sown. Therefore the process of cultivating is to break the capillary tubes and cork them by working a fine mulch over the seedbed, and thus conserve the moisture; so that when the seeding commences we will take off the blanket and insert the seed as best we possibly can, so that every grain that is planted will yield several healthy stalks each with large plump heads of grain; and it is to this point I wish now to direct attention most.

It has always been the aim of a designer of a combine to create a grain sowing and cultivating machine which would cause 3 grain plants to be grown where only 1 or 2 grew before, and thereby assist the farmer to reduce the cost of producing the bushel of wheat, not by increasing the number of acres sown, but by increasing the number of bushels grown on each acre. At the same time the implement must do its work quickly and with the minimum of power, so as not to increase the cost in that direction.

On sowing grain on well prepared land the first essential is to place the seed evenly on the solidified bottom of the seedbed made by the share of the machine. The second is to space each grain as near as possible to a given distance from each other. For it must be remembered each grain becomes a plant, and on each plant there should be many stalks which become straw bearing ears filled with grain. If a number of grains are placed in close proximity to each other they rob each other of nutriment and become weak and do not develop to the fullest extent. When this error in sowing happens there is always a space where there are no grains—sometimes many inches long in the rows. This piece of soil is wasted and will grow weeds only. If the grain is placed evenly each plant has its own little dominion from which to draw nutriment, and becomes a strong, healthy plant with many straws having large full ears and plump grain.

The third essential is that every grain must have a thin layer of finely pulverised soil over it. *The layer should be about ¾in. to 1in. thick, and the reason why it must* be finely pulverised is that drying air is kept out and moisture retained so that the young plant can readily reach the light of day. If a grain is placed on the seedbed and a clod of hard soil is placed over it, the young plant will seldom find its way to the surface, but will perish and become lost. With a machine that does not pulverise the soil there are many thousands of grains lost in this way on every acre. Therefore in this ah-ect a solid tyne machine sowing on the rear tynes has many advantages over a spring have -s the tyne and share are always at the correct set and dip and cut the correct The nar-h the minimum amount of draught, because it always maintains the set the right dire put on and does not vary according to the nature of the soil. It will *those of poo*-d and fertilizer right on the seedbed under the share, and a glance at Further step-ot will show this. The forward curve in the boot near the lower end quantity of thes and fertilizer well forward, and the fine soil pouring back over the wheats of better

heel of the share immediately covers them. If the tyne were standing on a hard floor and a few grains dropped in the top of the boot, they would probably bounce out from under the share, but this cannot happen when the machine is working in the soil, because it is covered too quickly by the soil coming over the heel of the share.

No doubt many farmers have had trouble with grass roots dragging around the tyne over the heel of the share and preventing the seed from reaching the soil or seedbed. This is very obvious on all spring tyne combines with their present design of share and boot, and with this type of machine very little if any of the grain and super reach the seedbed. It is all suspended in the pulverised soil and covered by what is termed the covering tyne, which is the rear row of tynes. This applies more particularly to machines using the centre row for sowing, which is incorrect, as it sows first and cultivates afterwards. The seed is sown by the two centre rows 7in. apart, and a tyne of the rear row comes along within 3½in. and any grain of seed that may have found its way on to the seedbed is disturbed by the wing of the rear share and pushed up near the surface and remains suspended in the pulverised soil.

The net result of that type of sowing is that the seed and fertilizer are under a small mound or ridge of soil, but not right down on the seedbed. Usually they are from half to two-thirds, between the top and the seedbed. Should a day of warm dry wind occur within five or six days after sowing, the result would be very detrimental to the crop. The dry wind takes every particle of moisture out of the ridges or mounds; if the soil was liable to drift, the mound would drift into the small furrows or depressions on either side of the ridge and leave the seed uncovered. If the seed has commenced to grow and the young tender plant and root has left the grain the plant would perish in a very short time. If the ridge did not drift the moisture would evaporate and the young plant would have a hard time until rain came, because the tiny root would not have had time to establish itself in the solid seedbed, where the moisture holds for weeks after it has gone out of the pulverised soil.

With the solid tyne and back row sowing together with a latest type of boot the difficulties mentioned are overcome. The two front rows of shares do the primary work of cultivating, and the two rear rows do the secondary cultivating and the sowing. The finished result is alternate shallow furrows and hoe ridges of equal distance apart. The seed and fertilizer in this case are under the furrow with a thin layer of pulverised soil over them, not under the ridge as in the case with centre row sowing. The seed being placed on the damp, solid bottom of the furrow, germination will commence almost immediately with the help of the moisture and warmth of the fertilizer. When the root leaves the grain it will grow straight down into the soil and will quickly establish itself, and the young plant will quickly find its way through the layer of fine mulch to the light.

Should a dry wind and drought come, the young plant will not come to any harm for many days because the root is established in damp soil under the mulch where the moisture cannot so quickly escape. Should drift commence it cannot interfere with the plant. It would only lodge around the young plant, but would not uncover it. It may at first seem a trivial matter to mention a few drops of moisture on a grain field, but it is a very important subject.

The successful dry farmer is the one who endeavours to capture, conserve, and utilise every particle of moisture that falls throughout the year; therefore the designer of machines must design with that object in mind, as it is under dry seeding conditions that these small but important points prove that they correctly overcome many disadvantages so often proclaimed against combines in favour of the ordinary hoe drill. (Secretary, S. G. Chynoweth.)

REDUCING COSTS OF PRODUCTION.

At the monthly meeting of the Taragoro Branch 11 members were present from the Roberts and Verran Branch. The subject of the meeting was a paper by Mr. A. T. Cowley, of the latter Branch. He mentioned that the obvious way of reducing costs of production was by reducing the cost of farm requirements, but that was beyond the farmer's control. It remained only for the farmer to follow the oft-repeated advice to take care of all articles used in the production of farm prod ts, and so lessen costs of repairs and replacements. There often arose the question of whether it was more important to push on with the work in hand with an implement out of repair and becoming more so every day, or to lose time by stopping work and overhauling it. The farmer needed to think carefully to decide which of the two evils was likely to prove the least costly in the long run. In some cases the rapid completion of the work would compensate for the inefficiency of the implement and the damage caused to it by neglect, but most often the ultimate cost of repairs, coupled with the loss due to the poor work done by an implement out of repair, would occasion the much greater

loss. In viewing the subject from another angle, ploughing could be taken as an example. Ploughing was the heaviest, slowest, and most power-consuming of all forms of cultivation. To produce the greatest possible return from a piece of land after one ploughing might therefore be said to reduce the cost of ploughing to a minimum. If instead of re-ploughing after a first crop, a second crop almost as good as the first could be produced with but a light cultivation, something would be gained. If that gain could be sustained by producing yet another crop of a different kind or by securing grazing as good as if the land had been ploughed twice instead of only once, then the cost of producing the crops and grazing had been reduced by the amount represented by the difference between the cost of the light cultivation and the cost of repeated ploughings. If, on the other hand, the yield of the crop or grazing had been lowered to an extent representing more than the extra cost of re-ploughing, the cost of production had been actually increased by the cheaper methods of working. Sound judgment in such matters was quite as necessary as industry and hard work.

Another phase to be considered was the relation of the farming plant to the work required. For example, to work a 10-horse team either on an implement that required 12-horse strength or on an implement that could be worked with eight, was bound to make farming operations more costly. Attempting to work an area too large for the farm plant to handle actually increased cost of production, because where land was insufficiently worked or where the working was unduly prolonged, reduced production resulted. The last two points, although good in theory, and no doubt equally so in practice, were an ideal rather than a realisation with many farmers through force of circumstances. Keeping the correct balance between the numbers and kinds of livestock carried and the cropping area of the farm was another means of producing the most profitable returns for the least possible cost; and as the proportions necessarily varied according to the seasons and to the market values of the various types of livestock, it called for sound judgment and foresight. The production of a ''sideline'' out of what would otherwise be waste from a main line had the effect of reducing the cost of production on the main line. In the matter of labour, every man's time should be effective in the production of something of greater value than his labour cost, whether he were an employer or an employee. Farming an area without sufficient man-power to keep the working plant in full operation and at the same time to give proper attention to livestock could not be expected to produce the utmost return for a given cost. When labour was employed the cost of wages meant an increase in the cost of production unless the employee's work was effective in increasing the value of production to the extent of his wage and his ''keep.'' If the extra value of production exceeded that amount then the hiring of labour might be said to reduce the cost of production by enabling more to be produced.

Points from discussions: Have only implements necessary for efficient working and avoid overhead expenses caused by idle implements. Get on to the fallow early and avoid extra workings, as they increased costs. In new country fire was very important in reducing working costs. A good initial burn saved much time and cost in clearing sticks, &c. A crop with good stubble should be burnt early in order to minimise bush cutting. (Secretary, T. Winters.)

LUCERNE: THE KING OF FODDERS.

The monthly meeting of the Yandiah Branch, held on 11th July, was attended by 12 members. Mr. A. O. Klem read the following paper:—

Lucerne is known as the king of fodders; it was cultivated in the early days and still holds its own as a perennial plant for pasture or irrigation purposes. Once it is sown, lucerne needs little attention and the plants will live for many years without having to be resown. If it is not given a chance to grow and if sheep are permitted to graze on it, the plants will soon die out. Fowls also, if allowed to scratch in it too much, will soon kill it.

Lucerne grows very well on local flats where it is flooded occasionally, but if irrigated it will grow much better. The best method of irrigation is to make small plots with banks around them, and flood these about once a fortnight. A very small plot may be watered with a sprinkler if the water is good, but if salty water is used on the leaves the sun will scorch them.

Before sowing lucerne, the land must be well prepared and free from weeds. It should be well worked and cultipacked. A shallow sowing with a drill or combine followed by a light harrow, is the most satisfactory. Good results have been obtained by sowing 6lbs. per acre. The best times for sowing are early autumn or early spring preferably August or September, as by that time one has a chance to have the soil in good order. Germination at that time of the year is also quicker, and frosts are not so severe.

The young crop should be cut with a grass-mower before allowing it to be eaten off by the stock. This gives it a better chance of growing stronger and the young plants seem much better for it. In a good season, or when the lucerne is a nice height, it may be cut with a binder and tied, thus making it better to handle. Lucerne may also be grown for seed, and this is very profitable. In harvesting the seed the stripper can be used, afterwards putting the seed through a small winnower. It has to be cleaned the same day that it is reaped. This year a small attachment was made to fit on top of the winnower to deal with the long stems, &c., which are always mixed with the pods after reaping and which do not come off the riddle. It worked on the same principle as a big E harvester, the long stuff coming out at the back of the machine and the pods at the front, the seed and dust going right through. The seed has to be cleaned a second time to remove the dust. The pods are best kept in a shed and turned twice a day until dry, then put lightly through a crusher to remove the remaining seeds. A harvester would not be a success, as it would choke with the green stuff that is amongst the seed at harvest time. (Secretary, O. Borgas.)

USE OF CEMENT CONCRETE ON THE FARM.

In the course of a paper dealing with the above subject and read at a meeting of the Brentwood Branch on 1st April, 1935, Mr. E. E. M. Twartz stated:—"A few of the uses of concrete on the farm are for foundations, floors, and walls of all buildings. It also finds its way into fittings in these buildings, and for the construction of water storage, water troughs, fencing posts, ornaments, rafters, flower pots, tennis courts and dozens of other uses. Cement concrete is a mixture of brick, stone, or gravel and sand bound together with cement. All the ingredients are thoroughly mixed together and then mixed with water. This mixture is placed into wooden moulds, where the moisture gradually dries off and a solid rock slab hardens out.

Concrete does not require any skill in using; just carefulness and thoughtfulness. The farm generally cannot run a concrete mixer, so it has to be mixed with a shovel. The mixing is one of the most important factors. The ingredients must be thoroughly mixed before the water is added. The material must be a uniform colour throughout. I have seen cement concrete work that has not been a success and the maker has put all the blame on the cement, but in 99 cases out of a 100 there has not been sufficient care taken with the mixing.

We are fortunate in having in our district such a fine deposit of gravel, which is ideal for floors and works up to about 4in. wide. Where a 4in. to 6in. thickness is required, use a good hard stone broken to a 2in. gauge. The mixture must always be measured; a guess is not good enough. Five parts stone or gravel, 3 parts sand and 1 part cement makes a good mixture for most concrete. Some may say it is an 8 to 1 mixture but that is not so. The stones are the strength of your work, the sand and cement being the filling. The above mixture should then be coated with a 2 to 1 or 3 to 1 mixture of sand and cement. Cement floors, which are the finest for most farm buildings, should, before the cement has started to set, have dry cement troweled into the surface. This leaves an excellent surface or finish.

Concrete fencing posts have not been used to a very great extent on the farms in this district owing to the fact that wooden posts can be procured from a neighbouring district, but the concrete fencing posts would be the cheapest proposition in the end. Cement concrete needs reinforcing with steel rods by allowing the concrete to harden around the rods.

With the present low price of cement and the many uses for it on a farm and the lasting and excellent job it makes, cement concrete will be used more than ever in the future. (Secretary, J. H. Boundy.)

SHEEP ON THE FARM.

The above was the subject of a paper by Mr. E. G. Jericho at the meeting of the Pinbong Branch on 25th May, when 12 members were present. Mr. Jericho advised selecting a line of large-framed Merino ewes. A large, square face was usually a sign of good constitution. Rams should be obtained from a reliable breeder. The sheep should be fairly fine-woolled, and the scales should be used to prove their value as wool producers. Ewes over 6 years old should be culled heavily. Wethers kept their condition best when 4 or 5 years old, and could then be sold during the winter months. To breed lambs for the freezers he used the Border Leicester ram on Merino ewes. Sheep lambing after the middle of May would generally rear a larger percentage of lambs, because there was usually some green feed available by then. Foxes would take some lambs if there were no young rabbits available. It was not profitable to keep a dog on a farm. If sheep had plenty of feed they were easily managed without a dog. Foxes and rabbits should be kept down. When poisoning rabbits with phosphorus it was best

to throw the poison a long way into the burrow and then fill in the burrow. To cope with blowflies, everything should be kept clean around the homestead, all skins skin-washed, and stretched by means of a few nails driven into the woolshed. The blowfly trap should be made use of; an effective poison could be made by boiling a cabbage in ½ gallon of water, adding 2ozs. arsenic, 2lbs. of sugar, and pouring it over some meat in a large tin. Meat kept in a kerosene tin and scalded every 3 days made a good trap. Kerosene could be used to clean a sheep. Shearing should be done before grass seeds were about, the sheep being kept on good feed for the last three weeks. They should have access to all paddocks after the first winter rains, but should not be overfed for wool production.

Ten members were present at the meeting held on 15th June, when Mr. E. M. Scholz read the following paper entitled "Subdividing to the Best Advantage."—The subdivision of a farm is something which should receive much consideration and forethought. In most cases in the event of an unimproved virgin farm being taken up, no consideration is given to this important matter. A patch of land is cleared and fenced at random. The homestead and necessary outbuildings are in any position that may suggest itself at the moment, and so it is left to be a source of inconvenience. In my opinion the homestead locality is of great importance. Of course it is usual and right to choose a spot as sheltered as possible. In this district this natural shelter has been abused or not used to the full advantage. The timber has been cleared away right to the backyard, and the surrounding paddocks are bare and treeless. I think that at least 10 acres of timber should be left surrounding the homestead, thus providing shelter for the stock and the home. This block of timber should be fenced and all necessary sheds, horseyards, stables, cowyards, &c., be contained therein. The homestead block should be surrounded by small paddocks of about 20 or 25 acres and from these should be extended the subdivision fences. Crops should be sown in rotation form, working from one side to the other, *e.g.*, one block may be wheat with its corresponding small paddocks of oats, the next may be fallow, and the next grass or stubble land. The purpose of the small paddocks around the homestead would be to gain easy access to corresponding divisions. Panels from these small paddocks should be made to act a dual purpose if possible. This is possible where two fences cross at right angles, as they should do in this case Straining posts in each of the four fences are placed at equal distances from each other, thereby forming a square. Two panels are made so that they may be closed at either end and not fixed to any particular straining post. It will then be found possible to use these panels as a race to any of the three outlying paddocks or as a barrier from same. Fencing posts should be placed from 5 to 10 yards apart according to their strength. A very good fence may be made with four wire "cyclone" fixed about 3in. or 4in. from the ground. A barbed wire should then be fixed about 3in. or 4in. higher and on the opposite side of the fence. This is to prevent big stock from crushing and damaging the cyclone when reaching through the fence. On top of the posts should be fixed a second barbed wire making a strong, substantial, and stock-proof fence.

At a meeting of the Koppio Branch on 19th June, 14 members were present to hear a paper, "Sheep Returns per Acre" read by Mr. M. T. Gardner, who stated that in some parts of the district because of heavy rainfall and the hilly nature of the land, with consequent heavy working, continuous cropping did not give the most profit. The country was far from being cleared of scrub, and in many cases unprofitable farming had to be practised for a number of years in order to kill the scrub growth and pave the way for more profitable utilisation of the land by grazing. The large areas of uncleared land forming a portion of most holdings in the district were a burden on the better portion of the holding, because it cost the same purchase price per acre, and had to bear the same taxes, rates, fencing charges and general expenses, without materially contributing to the returns per acre of the holding. The scrub also sheltered rabbits which ate feed on the better land, and foxes which raided the sheepfolds at lambing time, thereby further decreasing returns. The writer quoted figures from his own property to show that by clearing and cropping the scrub areas, the return per acre from the whole holding could be increased. He pointed out that although the clearing, working, and sowing the crop with superphosphate involved a good deal of expenditure, the returns from the few years crops would to some extent compensate for it. With clearing completed, the battle to keep up sheep returns per acre would not be over. Additional fodder, both in the form of dry and sown feed was necessary. With 500 sheep, 20 tons of chaff fed in March, April, and May would build them up for the winter. If 100 acres of grassland were fallowed late with the combine (after grazing had been finished by concentrating a large number of sheep on the area in the spring), and sown dry early in the year with 4 tons of superphosphate and 1bush. early oats per P[illegible] it would help the lambs to make good sheep or export lambs, and the extra wool good [illegible] valuable lambs would pay for the expenditure of supplementary feeding. Mr. so severe [illegible]ferred to use superphosphate in the above manner instead of applying it [illegible]assland, but either manner gave profitable results. (Secretary, M. T.

HANDFEEDING SHEEP.

The following paper was read by Mr. L. A. Slade, of Weavers Branch, at a meeting held 3rd June, 1935:—"The question of feeding sheep by any other than natural means has been a topic for discussion for very many years amongst all classes of sheepmen. It interests the mixed farmer, because sometimes (due to the necessity of fallowing or burning his stubble) he must cut his feed temporarily to very fine limits, and to the station man, for the necessity of providing against very serious losses due to drought conditions.

To many farmers the feeding of sheep conjures up as many problems as trying to stable-feed horses in hard working conditions; to others an added lot of work for little return. But my contention is that it is none of these things, and if one is only going to look at his sheep feeding from this light, he may as well remain as he is at present, but he is not going to get anything like the return he might off his land from the sheep section of it. Handfeeding of sheep is not necessarily a constant job unless one wants especially to keep any for stud or other purposes. It is only a very good means of being able to tide your sheep over a period when you are short of feed instead of having to sell them, as often as not on an unfavourable market. This happens quite frequently to most men unless of course they are lucky enough to have big reserves of feed. If they have, it generally means that they are not producing all that they might from sheep activities. Feeding long hay I have found very impracticable, for the sheep soon learn to only eat the heads and the first stem, and so there is far too much waste. After trying troughs, open ground, bag troughs, and boxes, I have come to the conclusion that there is only one really economic way to do it, and that is in a properly constructed rainproof automatic feeder.

It can be made to hold at least a week's feed for 100 to 150 sheep, or several days for a larger number. Last year I had 450 on one feeder, although I do not recommend anything like that number; but 250 can be fed from one. The make of feeder I have costs about £21. It was amusing to hear farmers agree that they were a good proposition, but at £35 (which was then the price) they were too dear and if only they came down £10 they would be quite a good proposition. Now that they are down to about £20 the same farmers still hold that they should be down more in price. The men who talk this way don't want to spend a penny piece on their wool producing. I wonder how far they would get if they applied the same ideas to wheat and tried

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doing without super. The actual feeding need not be very much, for provided sheep have anything at all to pick at in the paddock (and water in dry weather of course), they do not eat very much, but what little feeding they do take seems to make a wonderful difference to their vitality.

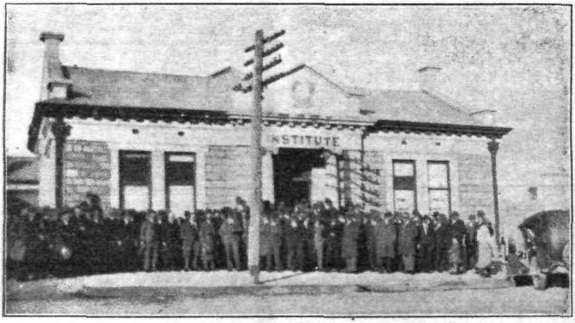
Another aspect is that the practice of bare fallow will be to some extent modified in the future, and there is no better way to clean up a paddock than to place a feeder and a flock of sheep in it. With an occasional short change they seem to be able to finish it off like fallow, and for barley producing at any rate it is ideal.

In conclusion the writer is of opinion that the handfeeding of sheep may be summarised as follows:—The handfeeding alone of sheep would not be commercially sound as regards general flocks.

It does pay and pay well to have a feeder, and when one is temporarily short of feed to assist the flock with supplementary feeding.

It is an ideal method to bare right out a paddock, and instead of burning feed and so wasting it to get some return from that feed.

The worst nightmare a farmer can be faced with is to know he will soon be eaten out and will then have to sell numbers of his sheep regardless of what they will bring. Handfeeding will save this. But if you are never faced with this possibility, you certainly do not get anything like what you might out of this branch of your farming in average seasons.'' (Secretary, H. W. Cornish.)



Delegates at the Upper North Conference, Booleroo Centre, 17th July, 1935.

MANAGEMENT OF FARM HORSES.

At a meeting of the Warcowie Branch on 17th June with an attendance of 13 members and visitors Mr. E. C. Jarvis read a paper dealing with the above subject, in the course of which he said that when bringing in the team after spelling they should be fed gradually for a few days in order to become accustomed to the feed. They should be worked for a few hours at first, gradually increasing the hours each day to a full day's work by the end of the week. In hot weather it was advisable to put a chaff bag under the collar. It could be best done by buckling the collar and then moving it towards the head, hanging the bag over the neck and slipping the collar back into place. About 5 inches of the bag should be turned back and the hames placed over it in order to prevent the bag moving out of place. Another good practice to prevent sore shoulders was to wash the shoulders with salt and warm water immediately the harness was removed after the day's work. Where a sore occurred a pad should be placed under the collar, either below or above according to the space available, and the draft of the hames altered if necessary, as that was often the cause of a sore. A mixture of half and half kerosene and oil could be applied with a piece of cloth. If possible it was preferable to heal the sore while working the horse. Every farmer should breed 1 or 2 foals each year. If 2 foals were reared every other year they could be handled and worked while hay carting at 2 years of age, and would take the place of a horse during harvest, working half a day each. The best time to start a mare breeding was at 4 years old. A foal should be taught to lead when a few days old, and be tied up with a halter; also accustomed to having its legs picked up. That *should be done every 3 or 4 months after weaning. A young foal should not be worked*

every time in the same place in the team, but should be accustomed to different places. It was a good plan to give them a few days on the rein occasionally, if they were at all suited for it. For feeding, long hay was suitable for the 2 evening feeds, with chaff and oats for the morning and mid-day feeds, according to the work required from the team. A team should leave their work before sunset, because if they were at all sweaty their coats would remain damp all night. The team should be watered before feeding, and be groomed every morning. The stable should be enclosed on 3 sides, with the open side facing the east. The fence should serve as a breakwind, and thus shelter the horses at night. (Secretary, A. F. Crossman.)

The monthly meeting of Boor's Plains Branch was held at Mr. A. Adams' homestead on 6th July. Mr. H. K. Queale read the following paper entitled, "Care and Correct Use of Harness and Working Equipment."—While I do not claim to be an authority on this subject yet I do claim that my methods are justified because of the results I have obtained during fifteen years I have been farming. To obtain the best results a man must have a natural aptitude for the work and a fondness for animals. He must also be patient and methodical. At the outset the primary necessity is a brush and comb. I prefer the "elbow grease" brand to the "glass case" brand. When not in use I advise a rail for collars, hooks for saddles and reins, and nails for winkers. The saddle should be hung by the strap immediately in front of the buckle attaching the breeching. A piece of half inch gas pipe fixed into a post is a good rest for the riding saddle. Of paramount importance in the care of harness is cleanliness. A thorough oiling at regular intervals is very beneficial. Collar linings should be well brushed regularly; the correct lining stands out deeper than the piping of a collar. The metal throat should be handled carefully and if possible not broken. The winkers need to be equipped with good rings, buckles and bits, while the blinds should stand out straight and firm and not point to the four corners of the globe. The reins especially need careful oversight, and should be well jointed and fitted with good spring hooks. The same may be said of the coupling straps. A riding saddle to be in good repair should be well and evenly padded; a broken "tree" renders a good saddle useless. For an apparent lapse of efficiency at work examine the harness before chastising the horse. Comfortably fitting and good equipment is a greater inducement to good work.

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BLOOD MANURE. BONE MANURE. BONE MEAL.

Now let us deal with the use of harness. The saddle horse, though a very useful and necessary animal, often receives very haphazard treatment. The saddle should bear evenly all over and the bridle should be fitted so that the bits do not drag on the horse's lips. A draught horse should be winkered so that he cannot see over the top of his winkers, while the bits should allow his mouth to remain in the natural position. The throat strap should be pulled up sufficiently tight to ensure safety and should be keepered. The forelock should be pulled out to hang freely. Collaring should be done with much care. The correct way to hold a collar is to grasp each side about half way up firmly in the hands without opening the top more than is absolutely necessary. This method will prevent the throat from being broken because of the support given it. I favour keepering the collar strap as an added help to holding the flap squarely across the top of the collar. To fit a collar one must have a certain amount of "horse-sense." A correct fitting collar should bear evenly and easily over its complete surface, while the fingers of the hand should be able to pass inside the throat, and the tips of the fingers to run round the rest of the piping. A loose collar creates friction and chafing, thereby rubbing off the skin's natural protector, the hair, and then naturally the skin rubs off, making a flesh wound. A tight collar pinches, the blood circulation is cut off, hence the skin dies leaving a sore similar to a blister. In young or very old horses there is a susceptibility to "blebs," requiring immediate lancing to prevent further complications. The hames should be fitted to the collar so that its length will just permit the hame strap to pass closely over the top of the collar. Its shape should coincide with the shape of the collar. Care should be taken to see that the link joining the hame at the bottom lies in the correct way, as this link is specially shaped, the bigger end resting in the hame. All mane hair should be pulled out so as to hang freely. Make sure that the draught hook is not too low on the point of the shoulder.

Now let us deal with the tandem team equipment, as that is the type of team mostly used in these districts. The swings should be sufficiently wide to allow the biggest horses to work in comfort, good hooks and bridle rings being essential. The chains should be light and strong, care being taken to see that no sharp ends of split links are protruding. The back bands should not be wrinkled and should be of such a length as to take the weight of the chains without altering the correct alignment. The leaders' spreaders should permit of a forty inch clearance, thereby saving the horses' ribs from chafing. The length of the coupling straps should allow the horses to stand up squarely in their chains, neither wider nor yet closer. For drill and binder work I prefer leather traces because of the narrow swings.

The Dray Horse.—The saddle should fit comfortably, without resting in any particlular spot. I advocate putting a bag under the saddle so as to preserve the lining, as well as acting as a little more padding. The breeching should be adjusted so that the D rests over the top of the rump directly between the hip points, and the breech part should come where the horse has most power and comfort—just below the point of the buttock. The tug chains should be of such length as to keep the horse from getting its collar over the point of the shafts and tearing his collar. The breeching chains should permit of comfortable walking while giving the maximum power in backing jobs. The back band should be taken up to a point where the dray balances.

Waggon Work.—The spiders should be adjusted according to the size of the horse carrying the chains at the natural trace position and with the "Rose" sitting in the same position as the D of a dray saddle. The belly bands may vary according to the temperament of a horse, but generally speaking should bear firmly against the girth when pulling, without any undue downward pull of the chains. The reins should pass through the leaders' hame rings, then at subsequent fixtures, passing through rings attached to lengths of straps (say 10in. or 12in. long) to allow for better manipulation by the driver. If any horses require shoeing, a competent farrier should be employed, which reminds one of the old English saying, "No foot, no horse." All harness should be carefully put away when not being used, if possible in a room set aside for the purpose. Above all remember that as the "eye of the master feedeth his stock," so should he also harness them. (Secretary, S. G. Chynoweth.)

LIVESTOCK AILMENTS.

Twenty-five members were present at a meeting of the Wasleys Branch on 13th June, when Mr. J. Rundle delivered an address dealing with the above subject. In the course of his remarks he said when a horse showed signs of sickness his pulse should be felt. That should be done by feeling along the jaw; the normal beats should be from 35 to 40 per minute. The majority of horse ailments were caused by disorders of the stomach, and were caused chiefly by eating damp or musty fodders. During times when fodder was scarce mouldy fodder could be fed safely by throwing it open to the sun and air for at least a day, thereby killing the injurious bacteria by exposure. In drenching a horse his throat should not be tickled or pinched; if the animal were given a light smack on the nose no trouble would be experienced. Small quantities should be given at a time, and the head should not be raised too high.

Damp and mouldy fodders set up gas pockets in the bowels, causing colic. An often recommended drench was 4 tablespoons of turpentine with 1½ pints of *warmed*, raw linseed oil. *For Sand*: 1 pint fresh milk with 1 dessertspoonful of tincture of nux vomica and ground coffee. A dose of the mixture should be given to horses after being brought off stubble fodder. *Blood-worms*: 2 pints of oats fed daily, pickled with strong bluestone solution by pickling 1 bag of oats with 1lb. bluestone to 2galls. water. Added to feed once daily for a week. *Spikes or Wounds in Hoof*: The spike should be withdrawn, and with the aid of a breast-drill, a hole should be bored to the depth of the wound. It should be then cleaned out, spirits of salt poured in, and plugged tightly with cotton wool dipped in Stockholm tar (repeated daily). *Chaff or Mote in Horse's Eye*: Place finger on upper eye-lid and push back over top of eye. Remove chaff by placing finger in mixture of equal parts of honey and powdered resin. Wash out with warm water and Epsom salts. *Founder*: Drench with 1 pint fresh milk, 4 tablespoonfuls bicarbonate of soda, 1 tablespoonful of ground ginger; followed 2 hours later by 6 packets of Epsom salts and 1 tablesponful salt, in order to cause thirst and thus make the animal drink. Stand the animal on wet clay. *Strangles*: House animal in roomy place free from draughts. Apply turpentine to abscess to draw it to a head. When the head forms lance it from top to bottom and syringe out occasionally with Lysol or other antiseptic. Steam with turpentine in hot water. Add saltpetre to drinking water. *Nose-bleeding of Racehorses*: Syringe adrenalin chloride solution into nostrils. *Extermination of Bot-Fly Eggs*: Apply tractor oil or other waste oil on any place where eggs are seen. *Trouble with Mare Foaling*: In cases of accidents such as ejection of womb, chloroform the mare and no further trouble would be experienced and the expulsion would immediately cease. Place chloroform bag to horse's nose at short intervals and watch the animal's side for breathing. After trouble of this nature douche out with water and permanganate of potash, or insert a gelatine capsule containing 2 drams of bismuth and 2 drams of iodoform. *Warts on Cow's Teats or Nose*: Apply castor oil daily for a week, and if not removed rub dry lemon or acetic acid on warts. *Discharge from Cow's Nostrils*: Blow burnt powdered alum into nostrils. *Prevention of Milk Fever*: Feed cow prior to calving with molasses added to feed. If affected with fever pump up; don't tie the teats but tap the hole with finger and it will seal. *Prevention of Bloat or Soursob Poisoning in Sheep*: Feed sheep prior to being put in field with chaff with either molasses, oats or bran added, and no trouble will be experienced. *Pink-Eye in Sheep*: Put affected animals in dark ventilated place, and to prevent infection rub equal parts of Stockholm tar and olive or castor oil over the eye—proved very effective. (Secretary, C. R. Currie.)

THE DAIRYING INDUSTRY.

The following paper was read by Mr. F. J. G. Collins at the Whitwarta Branch meeting on 15th July, 1935:—

The dairying industry is worth about £40,000,000 to Australia annually and will be worth considerably more in the near future. It all depends on the skill, keenness and enterprise displayed by dairymen.

There are several well-known breeds of dairy cattle in Australia, but there is no such thing as the "Best" breed, and I am positive that there never will be. Upon the ability of the man in charge depend the results of any breed, and it is important that the dairyman devote his time and energies to the breed he considers best fitted to his own particular conditions, and if he wishes to be successful, he must be sure that his heart is in the particular breed he fancies. Most of our successful dairymen now realise that testing is the only way to obviate feeding a lot of unprofitable cows. As a matter of fact the slogan, "Whether the cow keeps you or you keep the cow" is worth keeping in mind when dairying.

Always breed from the best producers, using a pure-bred bull. It is also necessary to give much attention to pasture improvement, involving the sowing of suitable grasses and clovers, together with the regular use of correct fertilisers and harrowing. The modern dairy cow has come to be regarded as a machine, but it requires much more consideration than most machines if the full return is to be obtained from it. It must be managed with sound judgment and a great deal of commonsense. Its health must be safeguarded; plenty of good water is vital.

In making a choice of dairy cattle attention will be focused on Shorthorns, Red Polls, Friesians, and Guernseys; the latter being somewhat large cattle requiring a richer or more level country with heavier feeding than the lighter breeds, such as the Ayrshire and Jersey. In hilly country and on the lighter grazing land the smallest breeds will prove much better to handle. In Victoria many dairymen even prefer the lighter cattle on rich country, such cattle being bred especially for dairying without consideration for dual purpose values.

The hard times being experienced at present in the industry are even harder for the dairyman who uses the "scrub" bull. That all the cattle breed societies have an

increased membership since the drop in butter-fat prices is surely evidence that the scrub bull is a bad asset. It is beyond the power of dairymen to raise the price of butter-fat, but it is in every dairyman's power to get better returns from each and every cow. Remember that a good pure-bred cow which is a heavy producer is not as costly to maintain as the cow from the "scrub bull." At present there is a big proportion of second grade cream going to the factories, and consequently a much lower return to the dairymen as a whole. In a paper such as this it would not be out of place to suggest some remedy to improve the percentage of choicest grade of butter in this State. I would suggest a much more rigid control of the industry by the Department of Agriculture, such as by making a higher penalty on factories which grade first grade cream as "choicest" (there is a very severe penalty in Victoria), by making the factories submit to the Department a list of all the suppliers of second grade cream. The Department could then have officers inspect the farms of the suppliers of the second grade cream, find out the cause of the cream grading second, and then give the dairyman instructions for the attainment of "choicest" cream. Suppliers who then ignore the officer's instructions, after a reasonable time had been given them, should be fined, if the fault of the grading of cream was through their uncleanliness. You perhaps wonder where the money for such a proposal is to come from, to pay the cost of the officers' inspections, &c. I suggest that a levy be imposed of, say, 1d. for first grade and 2d. for second grade cream, and from such fund the supervision of the dairies be paid for. You will then note that the supplier of "choicest" grade does not have to bear the cost of such supervision. Well, why should he? It is not his fault that the other suppliers are sending inferior cream. If this proposal were adopted I am sure that in the course of two years the percentage of choicest cream in this State would be over 90 per cent., as compared with about 29 per cent. at present.

It would be hard to estimate the value of a greater improvement on the quality of our cream; it would create better uniform quality, thus giving us better prices. I do not want this paper to be construed so as to mean that I am reflecting on the good work that the Department of Agriculture is doing through its very able officers. (Secretary, F. J. G. Collins.)

POULTRY.

HENS V. INCUBATORS.

In the course of a paper read at the Nelshaby Branch on 16th May, Mr. K. Noble said that the hen was the natural method of hatching and rearing, and though not always reliable, she would supply natural heat, ventilation and care. On farms keeping 10 or more fowls a 60-100 egg incubator was necessary. The average hatch was 40 chicks from 60 eggs. The cost of fuel—1½galls.—was 2s. 6d. per hatch, the time taken in attending to the machine about 16 hours, the cost of the machine, allowing it a life of 20 years with 4 batches a year, was about 1s. 6d. per hatch. A brooder was also necessary and would cost about 1s. 6d. per hatch; although cheaper to buy it would not have the life of an incubator. The total cost of one hatch of 40 chicks from a 60-egg machine was approximately 15s., or about 17s. with a 120-egg machine. The cost of feed per hen was approximately 1d. per week. To raise 40 chicks, 4 hens sitting on 15 eggs each would be needed, costing 1s. for feed. Time taken in attending to the hens might well be 12 hours. Material used for nests and coops or house or yard taken over a number of years would reasonably be 1s. per hatch. A further cost of 1s. for feeding the hens during the brooding of the chicks made a reasonable total of 9s. 6d. per hatch and rearing of chickens to the same age as with an incubator. It would be seen that the hens were probably cheaper than an incubator by 5s. 6d. Eighty chickens from 8 hens would cost 15s., as against 30s. with a 60-egg incubator, and 17s. with a 120-egg incubator. The cost was therefore greatly in favour of hens as against a small incubator, but very little against a large one, because a big machine cost very little more in either fuel or time than a small machine. A great disadvantage of hatching from hens was that the usual broody period was rather too late for good hatching with regard to development of the chickens. Also, unless they were fed very correctly their laying began when the price of eggs was falling. For that reason alone chickens hatched early would pay for the necessary equipment. Chickens hatched in July—the general time of hatching by incubator—would develop and lay in December and continue through the period of high egg prices, except for a few which would moult if care was not taken. Chickens hatched in October—the usual month for hen hatching—would not begin laying except under very favourable conditions until June, a difference of 2 or 3 months in the cost of feeding, and with a falling price of eggs to follow.

The Advantage of High-Class Laying Hens.—A hen must be fed on food suitable firstly to maintain the body and secondly to produce eggs. If a flock of 100 hens capable of producing 300 eggs, totalling 2,500 dozen, was compared with a flock of hens producing 100 eggs it would be seen that it would be necessary to keep 300 hens of the poor laying, 100 egg strain, to produce the same total of 2,500 dozen, and at the same time it would be necessary to feed an extra 200 hens, which would also need

further housing accommodation and attention. Further, the 300 hens of the 100-egg strain would produce the bulk of their eggs between July and December, during which time eggs were cheapest. The 100 hens of the 300-egg strain would necessarily have to produce their eggs over a longer period, whereby they would secure a much higher average price per dozen. The returns had been calculated (as shown below), the eggs of each strain being distributed over the general laying months of that strain, and priced by the prices received each month during May, 1934, to April, 1935:—

	£	s.	d.
100 hens of 300-egg strain produce 2,500 dozen eggs at approximate average price of 8d. per dozen	84	7	6
300 hens of 100-egg strain produce 2,500 dozen eggs at approximate average price of 7d. per dozen	74	7	6
100 hens of 100-egg strain produce 833 dozen eggs at approximate average price of 7d. per dozen	24	15	10

The figures showed £10 in favour of the 300-egg strain on 2,500doz. eggs alone, without extra housing, &c. It also showed £59 11s. 8d. in favour of 100 hens of 300-egg strain against 100 hens of 100-egg strain. The better layers would cost more to feed, but not £59 11s. 8d. above the cost of feeding the poorer layers. Feeding must be studied carefully. Tests conducted at Parafield Poultry Station showed that high laying hens could not be expected to produce the maximum number of eggs if fed as are those on the average farm. Neither could hens of lower laying strains be expected to produce many more eggs if fed the same as those of good laying strain, although they would improve in time by such feeding, if combined with correct breeding from the best stock. Fowls of high laying strain would degenerate in a very short time if not fed and bred correctly. Also fowls bred to a high standard would be liable to sickness if not kept to that standard, although if cared for correctly they would not be more subject to illness than the average fowl.

Selection of Eggs for Setting.—Since the trade demanded large eggs rather than large numbers of small eggs it was well to select eggs for incubation from those which were most likely to produce strong chickens of the best type, which in turn would produce large eggs. The eggs selected should be large, but not over-large, nor unshapely, nor those from pullets which were in their first year's laying, because there was a tendency to degenerate in the size of both hens and eggs produced from frequent hatching from such eggs. When selecting the eggs, they should be tested by lamplight to see that none were cracked. Stale eggs could also be detected; they showed a shadow within the shell which moved slowly when the egg was moved. It was caused by

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part of the contents thickening and settling to one side. Such eggs, as well as those very light in colour, should be rejected. Where it was necessary to keep eggs several days before the required number was collected, they would keep better if packed on end with the large end upwards. If necessary they could be kept a week before setting; if so, when hatching by incubator, the eggs should be heated slowly, reaching hatching temperature after 24 or 30 hours, because in older eggs the embryo which formed the chicken became weaker, and rapid heating would destroy it.

Incubators and a Few Points on Hatching.—Adequate ventilation on incubators was necessary, but draughts should be avoided as they might cause the eggs to be chilled on one side. Incubators of the hot air type were drier than hot water machines, needed a better moisture supply, and for the same reason needed less fuel. The correct temperature for hatching hen eggs was 101 degrees. In incubators the source of heat was generally above the eggs, so that one must allow for the temperature at the bottom level of the eggs being lower than at the top level. The bottom temperature was about 99 degrees, which required the top temperature to be about 104 degrees. If more eggs were placed in the tray than it was intended to hold they would be tightly packed together, which would tend to retard the penetration of heat. The temperature must be high enough to start the germ in the egg growing, or it would weaken and die. Therefore the first few days were the most important, and half a degree at that stage would make a lot of difference. Later they would withstand much greater variation in temperature, except when about to hatch. Eggs near the outside of the tray received less heat than eggs near the centre, and therefore should be changed about when the eggs were being turned. Eggs needed a good supply of air, not only in the machine, but particularly when they were taken out to be turned. The time of airing should be gradually increased to half an hour on the nineteenth day—unless the weather was very cold—after which the machine should be kept closed if possible. Turning the eggs too near to the time of hatching resulted in some chickens being placed with the beak downwards, and many would not hatch after chipping if in that position. Overheating the eggs continually or often would cause many "dead-in-shells." Lack of moisture would produce the same result. (Secretary, J. Lawrie.)

MANURE IN THE ORCHARD.

Fourteen members attended the meeting of the Warcowie Branch on 16th July, when Mr. F. Williams read the following paper:—

Fruit trees, like other plants, derive a portion of their food—about one-twentieth—from the soil. It follows, therefore, that a sufficiency of plant food must be present in the soil in order that the orchard may thrive.

It must be borne in mind that as far as plants of any description are concerned, "enough is as good as a feast." Any manure present in the ground, over and above the plant's requirements, is surplus, and for an orchardist to put it there is waste. At this point it may be as well to mention that some manures benefit the plant by improving the physical condition of the soil. By physical condition is meant the texture, the heaviness or lightness of a soil, or its water-holding capacity.

The error of supplying too much of any particular manure may be in the application of artificial manures, such as superphosphate or sulphate of ammonia. It is well known that many Australian soils are deficient in phosphoric acid. It is obvious therefore, that an over-application of nitrogen in the form of sulphate of ammonia is no remedy. Furthermore, it is difficult in many cases to ascertain just what manure or what particular plant food is lacking in any particular soil.

In the application of artificial manures lies another danger. It is well known that roots have two marked tendencies—(*a*) to be attracted by plant foods, and (*b*) to "chase" water (hydrotropism, hydro=water). It follows, therefore, that care must be taken where the manure is applied. If the manure is applied superficially, *i.e.*, on the surface, surface roots may result, to the detriment of the tree. Briefly, the further down a manure is placed, the better for the tree.

In view of the difficulties confronting the fruitgrower, many of them overcome the difficulty by using a general manure, that is to say, one which supplies all foods, such as stable manure or green manure.

Stable manure is good, but green manure which is ploughed into the soil is an improvement, as it needs no carting and spreading, and contains all plant building substances, whereas, in the case of horse or cow manure, much of these substances have already been removed by the animal. The application of such a manure serves a two-fold purpose. It supplies all a plant's food requirements, as already stated, and, by the addition of humus, or decaying organic matter, it tightens up a soil which is too light, or renders more friable a clayey soil, which may be too stiff; and the capacity to absorb and retain moisture is improved.

The method of planting trees in an orchard requires some consideration. A planter must be guided by circumstances. A man who proposes to plant trees in a wet district would have to consider drainage, or his soil will become waterlogged and his plants

perish. In digging the holes, care should be taken to see that these are no deeper than the surface soil—they must not penetrate the hard subsoil, or the hole may form a miniature reservoir, into which the water from the vicinity may drain, and drown the tree.

No such problem confronts the man living in a dry district. In fact, just what the dweller in a rainy locality finds it most necessary to guard against, is what is most desirable in less favoured parts. To allow trees in these parts the best chance of surviving and flourishing, the deeper the hole the better, especially if the cavity extends below the hard subsoil, if such exists. Under these conditions, the infrequent rains, if encouraged, drain into the hole, and soaking through the loose soil surrounding the roots, permeate downwards, taking with it probably much of the "goodness" of the soil in solution, and encouraging the roots to follow. If small waterings are avoided (they induce a surface rootage), a deep and well developed root system is established which results in more rapid growth, and probably a heavier crop. (Secretary, A. F. Crossman.)

THE AGRICULTURAL BUREAU.

At the annual meeting of the Mount Hope Branch held on 16th July, and attended by 12 members, Mr. D. K. Speed read a paper entitled "Stimulating Interest in Our Branch of the Agricultural Bureau." Poor attendances in the past had been largely due to lack of variety in the programmes of the monthly meetings. Papers had been the subject at every meeting, and members refrained from taking part in the discussion for fear of hurting the feelings of the writer. The lack of discussion of papers caused members to lose interest. In order to add variety to the programme he suggested holding a debate with 2 or 3 members a side and the balance of the meeting acting as judges. An annual crop inspection would give members a knowledge of how their neighbours worked their land. Usually only 9 meetings were held per year, and the above suggestions would help to add variety to the meetings. (Secretary, J. L. Vigar.)

In the course of a paper read at the annual meeting of the Morchard Branch on 14th June, Mr. C. Halliday, junior, said that the year of Bureau activities just ended had been one of interest to most of the older members. He asked had it been the same to the younger members, or had it been a bore to them to attend meetings? If the interest was there the younger members would attend; and if the interest was lacking it was the part of the older members to do something to supply that interest. The Branch could arrange more frequent visits and addresses by the local Departmental Instructors. Members should make every endeavour to induce visitors to attend meetings. If a non-member did not attend when invited the first time, he should be asked again. Mr. Halliday suggested that papers had had their day. They had been written and re-written and discussed until they had become a matter of routine at Bureau meetings. Something new was needed to awaken interest. Reports of past years all showed that improvements in farming practices were due to the Agricultural Bureau. If the Bureau was of such value to farmers in the past it would be of even greater value to the farmers of the future, as the need for improvement was just as great as ever it had been. (Secrtary, E. T. Tilbrook.)

QUESTION BOX.

The meeting of the Wasleys Branch held on 11th July took the form of a Question Box. Seventeen members were present. *Question*: Best type of harrow-bar to prevent dragging? *Reply*: A wooden or pipe bar fitted with 8in. wheels was best under damp conditions. A member suggested putting chains from the end of the bar to the swings to cause it to be lifted by the pull; or to place sticks through the adjustment loop

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passed under the bar protruding about 3in.—these would be most effective for leaves of 4 harrows. *Backbands on the horses were also of assistance. Question:* Cause of a ewe producing twin lambs—whether caused by the condition she was in when mated or by the ram she is mated with? *Reply:* Most English rams were prolific producers, but better results were obtained from ewes in good condition than in poor condition. *Question:* Would it be beneficial to roll barley or oat crops or leave them in a rough state? *Reply:* Under dry seasonal conditions it was beneficial to roll oat crops, especially oats which had to be cut for hay. (Secretary, C. R. Currie.)

OTHER REPORTS RECEIVED.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
		SOUTH-EASTERN DISTRICT.		
Mount Gambier	14/6/35	15	"Milk Fever and Calcium Deficiency"—A. C. MacMillan	J. E. Morphett
Wolseley	8/4/35	9	Harvest Reports	E. W. Sharrad
Wolseley	18/5/35	140	Social	E. W. Sharrad
Wolseley	10/6/35	10	Discussion	E. W. Sharrad
Tantanoola	7/7/35	15	Annual Meeting	L. J. C. Osborne
Allandale East .	11/7/35	14	Address—W. H. Downes	R. T. Laslett
Rendelsham ...	13/7/35	8	Annual Meeting	F. Todd, jun.
Penola	18/7/35	8	Annual Meeting	F. W. Hinze
		LOWER NORTH DISTRICT.		
Brownlow	12/6/35	15	"Farm Book-keeping"—G. H. Biar	A. R. Steinborner
Koonunga......	10/7/35	20	Annual Meeting. Debate—Pigs *v.* Poultry	H. Mibus
Black Springs ..	9/7/35	10	Discussion	K. H. Dunn
Buchanan	10/7/35	12	Question Box	L. V. Bell
Rosedale	—/5/35	12	Address—C. A. Goddard	W. E. George
Rosedale	24/6/35	12	"Fruit Trees"—J. B. Ruediger	W. E. George
Hanson	9/7/35	22	Annual Meeting	M. deN. Lucas
Blyth..........	12/7/35	28	Travel Talk, Canada and U.S.A.—D. N. Martin	R. H. Eime
Penwortham ...	20/6/35	8	Address—M. W. Aird ...	A. R. Jenner
Tarlee	16/7/35	25	Annual Meeting. Address—H. J. Apps	N. L. Clarke
Greenock	15/7/35	18	Annual Meeting	A. Schubert
Stockport	12/7/35	15	Annual Meeting	R. Koch
		MIDDLE NORTH DISTRICT.		
Gladstone	9/7/35	14	Address—C. A. Goddard. Paper—Mr. Dunmore	Max Hoare
Gladstone	30/6/35	21	Annual Meeting. "Stock Ailments"—J. Rundle	Max Hoare
Beetaloo Valley	15/7/35	9	Annual Meeting	B. W. Giddings
Snowtown......	12/7/35	14	Annual Meeting	A. R. Hocking
Wandearah.....	18/7/35	8	Address—H. B. Barlow .	L. A. Jacobs
Redhill	16/7/35	9	Annual Meeting	Lance Harris
		UPPER NORTH DISTRICT.		
Appila	4/7/35	100	Annual Meeting (Social)..	E. H. Wurst
Murraytown ...	18/5/35	11	"Care of Farm Machinery"—A. Scholz	E. B. Pitman
Murraytown ...	15/6/35	11	Discussion—"F.A.Q. Wheat"	E. B. Pitman
Black Rock	4/6/35	6	Annual Meeting	R. E. Kitto
Orchard	12/7/35	11	Exhibit of Useful Devices, etc.	E. Tilbrook
[illegible]	8/7/35	12	"Horse and Cattle Breeding"—S. G. Stone	E. W. Hulster
[illegible]	16/7/35	25	Annual Meeting	P. C. Cole
[illegible]	24/7/35	13	Annual Meeting	E. P. Wall

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OTHER REPORTS RECEIVED—*continued.*

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
			YORKE PENINSULA DISTRICT.	
Weavers	1/7/35	15	Paper—L. M. Gleeson ...	H. W. Cornish
Brentwood	14/5/35	15	Addresses—R. Hill and F. Richards	J. H. Boundy
Brentwood	13/6/35	12	"Government Assistance to Farmers"—J. J. Honner	J. H. Boundy
Bute	20/6/35	6	Formal	H. G. Perry
Bute	18/7/35	7	Annual Meeting	H. G. Perry
Paskeville	16/7/35	10	Annual Meeting	J. Prouse
			WESTERN DISTRICT.	
Balumbah......	3/7/35	14	Address—H. D. Adams .	J. E. Swann
Maltee	4/7/35	14	Annual Meeting	E. Schwarz
Miltalie	25/6/35	10	Question Box	S. D. Ramsey
Green Patch ...	11/7/35	7	Discussion	C. J. Whillas
Taragoro	11/7/35	9	Annual Meeting	T. Winters
Balumba	17/7/35	13	"Control of Pests"—N. A. Jericho	J. E. Swann
Minnipa	16/7/35	—	Annual Meeting	W. H. Crowther
Pygery	16/7/35	12	Annual Meeting	A. Day
Kyancutta	4/6/35	15	"How to Improve our Grasses"—M. O'Brien and E. A. Kelly	E. A. Kelly
Kynacutta	2/7/35	12	Homestead Meeting at property of E. A. Kelly	E. A. Kelly
			EASTERN DISTRICT.	
Coomandook ...	2/7/35	16	Address—R. L. Griffiths .	W. R. Trestrail
Yurgo	24/6/35	9	"My Methods of Cropping"—J. Bullen	H. M. MacKenzie
Lameroo	12/7/35	17	Annual Meeting. "Care Farm Machinery"—J. H. Spratt	A. G. Potter
Coonalpyn	10/7/35	11	Homestead Meeting. Pruning Demonstration—E. Leishman	C. C. George
Marama	19/7/35	8	Annual Meeting	Thos. C. Hinkley
Ramco	1/7/35	11	Address—E. Leishman...	J. J. Odgers
Ramco	15/7/35	10	Annual Meeting	J. J. Odgers
Coomandook ...	26/7/35	12	Annual Meeting. Question Box	W. R. Trestrail
Chapman Bore..	22/7/35	12	"Care and Handling of Wool"—W. Whitehead	J. P. Krollig
			SOUTH AND HILLS DISTRICT.	
Blackwood	9/7/35	—	Annual Meeting	H. Goldsack
Longwood......	15/6/35	13	Homestead Meeting—Mr. A. Cameron	H. G. Haines
Hartley	10/7/35	7	Annual Meeting	W. J. Brook
Frayville	11/7/35	10	"Marketing"—H. Schofield	H. H. Lamm
Echunga	10/7/35	12	Annual Meeting	L. H. Walters
Shoal Bay......	16/7/35	4	Annual Meeting	E. B. Bell
Cherry Gardens	13/7/35	9	"Fattening Pigs"—D. B. Blakeley	A. R. Stone
Port Elliot	*20/7/35*	—	*Annual Meeting*	F. C. Keen
Blackheath	18/7/35	7	Annual Meeting	E. H. Paech
McLaren Flat...	11/7/35	24	Address—A. Ophel	P. T. Wait
Inman Valley...	25/7/35	10	Annual Meeting	S. Hacklin

WOMEN'S BRANCHES.

SUBJECTS FOR BUREAU MEETINGS.

If you have no other subject in mind, here is a list from which you might choose when asked to contribute to your branch programme.

The Farm.	The Home.	General.
Dairying—	Home Management—	Inter-Branch Visits
Care of Milk and Cream	Furniture—	Competitive Exhibition
Buttermaking	Choice	Flower Show
Cheesemaking	Repairing	Practical Demonstrations
Pigs—	Needlework	Social
Bacon Curing	Knitting	Music in the Home
Beekeeping—	Rugmaking	Good Reading
Honey	Clothing—	Hobbies
Horticulture—	Choice	Physical Culture
Vegetable Growing	Repairing	Labor Saving Hints
Flower Growing	Dressmaking	Spring Cleaning
Poultry—	Pattern Afternoon	Entertainment in the Home.
Dressing	Children—	
Incubation	Care and Management	
Rearing Chicks	Cooking—	
Turkeys	Recipes	
Ducks	Recipes for Christmas	
	Lunches	
	Jam Making	
	Fruit Preserving	
	Fruit Drying	
	Fruit, Value of	
	Pickles and Sauces	
	Sweet Making	
	Exhibition of Home Crafts	
	Christmas Gifts	
	Home Nursing	

THE USE OF CUCUMBERS.

The following recipes were given by Mrs. W. Patterson at the meeting of the Williamstown Branch held on 11th April:—

Pickled Cucumbers or Gherkins.—Obtain cucumbers or gherkins carefully picked and as near the same size as possible. Make a brine strong enough to float an egg, and for every 2 quarts of white vinegar, add ½oz. cloves, 1oz. of white ginger (bruised), ½oz. mustard seed, ½oz. of mace. Boil the brine and pour over cucumbers in an earthenware jar. Leave overnight. Next day drain off quite dry. Put all spices and vinegar in a stewpan and bring to boil for a few minutes. Pack cucumbers into a jar, strain the vinegar over them and let stand 24 hours, then put all back into the stewpan. Let simmer until cucumbers are green, but do not boil. Put in jars or bottles and seal at once. If sweet pickle is preferred add a breakfast cup of sugar.

Mustard Cucumber and Apple Pickle.—2lbs. cucumbers, 1lb. each apples, onions and sugar, ½oz. tumeric, 1 teaspoon mustard, 1 tablespoon plain flour, a few chillies, allspice and cloves to taste. Peel and cut cucumbers, apples and onions. Add good handful of salt and stand all night. In the morning drain off the liquid and put into preserving pan. Cover with vinegar and add sugar, also cloves and allspice in a little bag. Boil 18 or 20 minutes. When boiling, add mustard and tumeric mixed with vinegar, and bring to a boil again. It is ready for use when cold.

Cucumber and Apple Chutney.—4lbs. each cucumber, apples and onions, 2lbs. sugar, 1oz. cloves, 2 handsful raisins and/or sultanas, 1oz. peppercorns, ½oz. cayenne pepper. Cut up cucumbers, apples, onions and sprinkle with salt and stand overnight. Strain and add ingredients and cover with vinegar. Boil for 1 hour.

Pickled Cucumbers.—20 cucumbers, apple or long, freshly picked. Lay in a strong brine for 24 hours, then take out and drain. Boil enough vinegar to cover them, to which ½ tablespoon allspice, a few chillies and bay leaves, and a small cup of sugar have been added. Drop cucumbers into boiling vinegar and stand 3 minutes. Cool in vinegar and then put in jars and seal down. (Secretary, Mrs. A. Cundy.)

CONFERENCE OF UPPER NORTH WOMEN'S BRANCHES.

The members of the Wepowie Women's Branch have every reason to be proud of the success which attended their first effort at organising a district conference. Mrs. J. Burns (Wepowie) presided over the meeting, there being a record attendance of women at all the sessions—delegates being present from Eurelia, Wirrabara, Belalie, Wilmington, Morchard, and Wepowie Branches. In addition the women of the local Branch arranged the catering for approximately 300 people, and assisted in the staging of an excellent exhibit of preserved fruits, small goods, jams, needlework, &c.

The following resolutions were carried:—

1. That the Baby Health Train be sent out on the narrow gauge systems to outback towns where it is a necessity, as doctors are not so plentiful as with the districts on the broad gauge lines.

2. That the Women's Bureau Section of the *Journal of Agriculture* be enlarged and improved.

3. That this conference is in accord with the suggestion of the Narridy Women's Branch that a non-competitive exhibition of women's handicrafts should be staged at the Annual Congress.

Exhibit staged by the Wepowie Branches of the Agricultural Bureau at the Upper North Conference, Booleroo Centre, 17th July, 1935.

Miss E. Campbell, Dip. Dom. Econ. (Education Department), addressed the Conference, and Mr. J. O. Hatter (District Dairy Instructor) spoke on the care of milk and cream on the farm.

The following papers were read and discussed:—

RENOVATING AND REPAIRING CLOTHING.

[Mrs. FRED CUMMINGS (Belalie).]

Many a garment which in more prosperous days was cast aside, is now renovated and refashioned. Last season's frock is quite fresh with a new vest or collar and perhaps a little alteration to the sleeves, which always date a garment.

A costume makes a nice coat frock for the house when past out-door wear, and a tweed coat may be fashioned into a wrap-round skirt. On large figures frocks always wear under the arms first, and it is annoying to find a frock of good material spoilt in this manner. Such a frock can be renovated by cutting out the worn parts, then making a yoke or pinafore effect with contrasting material. The sleeves may be all contrast, or top of one kind and lower part of the other. A glance through the fashion books will give plenty of ideas. Adult garments can always be made over for children. Small pinnies or bloomers may be made from men's fashion shirts, while Fuji silk shirts make blouses or bloomers. It is just the collars and sleeves of shirts which wear out, leaving quite a lot of good material to be used up. The best pieces of a worn-out flannel will often make a flannel for a small boy, and a pair of knickers with lots of wear in them may be cut from a pair of worn-out tweed trousers. Made with double seats they last longer.

It is often a problem to know what to do with the clothes of the growing girl; they so soon become too short or too tight. If the sleeves and bust of a frock are too tight, cut the frock off at the waist and make a skirt to wear with jumper or blouse. If not too short, it could be made into a pinafore frock by cutting out the sleeves and the neck, then binding the edges with military braid, bias binding, or pieces of the same material cut on the bias. If a pinafore frock is too short, it may be lengthened by joining short pieces with pointed ends on each shoulder. Finish with buttons on the points back and front. Another way to lengthen a frock is to open out the belt and stitch it into the waist of the frock, a wider belt of the contrast material will hide the join, and a couple of inches are added to the length. If the hem of a child's frock is bound with bias binding before being hemmed, to lengthen, undo the hem, press, and the job is finished.

When renovating, do not forget the useful packet of dye. If the directions with each packet are followed carefully, home dyeing is simple, and a faded garment has a new appearance after a dip in the dye bath. If it is not necessary to do these things for children in the home in spare time, use up old garments to clothe some poor unfortunate child who is in need of warm clothing.

Repairing Clothing.

"A stitch in time saves nine," is well worth remembering when taking care of clothing. A small hole or tear neglected soon becomes a big one, and requires more than the proverbial nine stitches to repair it. Repairing is an important part of woman's work, more especially where there is a family to clothe.

Men's and boys' garments are usually the most difficult to keep in repair, so these hints may be useful. Frayed edges of coat fronts, sleeves, and the edges of vests look very untidy, and these may be bound with braid or some matching material cut on the bias. Another way is to pare the rough edges and buttonhole with strong thread. The following is a quick way to patch the knees of men's trousers:—Rip up the side seams and cut out the worn part. Cut a piece of material (the same or a near match) a little bigger than the worn piece. Stitch the new piece to the top and bottom edges, then stitch the side seams again and the job is finished. Sometimes a hole is torn in a perfectly good suit, and the best way to repair this is to darn it neatly with threads drawn from the same material. If none of the material is available, pull some threads from the inside seams of the trousers. A tear mended in this way is not noticeable. With school boys, mother's trouble is to keep sound seats in their knickers. The best way is to reseat instead of patching. Again it is wise to use a piece of the same material or a match as near as possible. Unpick the lining from the waist, then unpick the side and back seams and cut out the worn parts. Cut new pieces a little bigger than the old to allow for turnings. Join to the top and bottom where the old pieces were cut off. Press the seams well, then stitch the sides and back seams and press again. Attach the lining to the waist and the knickers will be as good as new, with no unsightly "bull's eye" patches to annoy the small wearer. Men's trousers may be mended in the same manner. See that trouser buttons are

sewn on tightly, use very strong cotton or thread (crochet cotton in a coarse number is good). Put a pin through the material at the back and sew over this. When the pin is removed it leaves the threads loose, and if the cotton is twisted *round* and *round* under the button it forms a strong hold. When the tail of a flannel shirt wears out, put a fresh one on with new flannel, not old. Patches on flannel should be herring-boned on the raw edges; a flannel patch is too thick and bulky if turned in and hemmed. Patch underpants with a piece from an old pair. This is better than darning, but be sure the material is put on the same way or it will not stretch or give. If the cuffs on a shirt wear and the rest of the garment is sound, unpick the cuff and take it off. Turn the part that was inside towards the outside and stitch it on again. The worn part of the cuff, which naturally comes on the inside after it has been turned, should be neatly darned with cotton or silk. Often the sleeve of a coloured fashion shirt wears into a hole and no matching material is at hand for a patch. Cut off the tail for patches and put on a new tail of some plain material. When putting new neck-bands on shirts, cut pieces for the fronts and put on with the neck band. It saves the wear on the front. It is easier to patch the children's bloomers if the seams are unpicked and the patches joined in with the seams. To save time, stitch the patches on with the sewing machine. Stitch close to the edge and it is quite neat and very strong. Then cut out the worn parts and hem by hand. When putting a patch on a frock or apron with a pattern on the material, put the patch on the right side, and take care to match the pattern exactly. Holes or tears in woollen frocks are neater if darned with threads drawn from the same material. Stocking mending is a problem to mothers of families. Darn the holes on the cross and they wear better. Use a mushroom darner for large holes. It is a great help, and double wool will fill the hole quicker. Too many darns are not comfortable so it is better to put new feet in the socks or stockings. Cut out the worn feet and replace with fresh ones cut from the legs of an old pair. If too short, unpick the hem at the top, or add a piece to the top. Home knitted socks or stockings may have new feet knitted

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to the legs by cutting off the feet and picking up the stitches. This is less work and gives the socks a new lease of life. With silk or lisle stockings, one must stop a ladder at once or it will run the whole length of the stocking and spell ruination. If the silk stockings are good ones, it pays to get them repaired. One can buy a special needle for repairing silk stockings, but it is a great strain on the eyesight, and scarcely worth the risk, when one can get them mended by an expert at a reasonable charge.

This hint is worth trying; when buying stockings procure two pairs the same, then if one stocking gets a ladder, it will still be possible to use the odd one by making up a pair from the others.

APPLES AND THEIR USES IN THE HOME.

[Mrs. P. Cole (Wilmington).]

As good apples possess valuable properties, their medicinal value cannot be over-estimated, and as a general rule, they are so cheap as to be within the reach of all households. Fruit is especially necessary to children, and they tire very quickly of baked and stewed apples, but if they are presented in new and attractive forms, they will be readily consumed and appreciated. The white of an egg whipped to a stiff froth, sweetened and placed on stewed apples or spread over the baked ones, and served as a frosting will appeal to the children at all times, and if the apples are supplied with stuffings of raisins, dates, or apricot jam, these all make for variety and will ensure a speedy disappearance. Variety in cooked apple dishes is a consummation not always attained by the home cook, and these somewhat different sweets will surely meet with a warm welcome.

Recipes.

Apple Custard Pudding.—Pare, core and quarter 1lb. of apples, and cook in 2 tablespoons of water until soft. Remove from the stove, add a pinch of salt, a small cup of sugar, a generous tablespoon of butter and the grated rind and juice of 1 lemon. Mix 1 cup fine bread crumbs with 1 level tablespoon cornflour. Add 1 cup milk and the well beaten yolks of 2 eggs. Beat well with the apple mixture, leave for 20 minutes, then pour into a well greased piedish, and bake about 45 minutes in a very moderate oven until a delicate biscuit colour. Whisk the 2 egg whites very stiffly with 2 level saltspoons of cream of tartar. Pile in rough heaps on pudding, and return to oven to set. Serve hot or cold with cream or custard.

Apple and Cornmeal Mould.—Pare, core, and slice very thinly 1lb. cooking apples. Squeeze the juice of a lemon over and add the grated lemon rind. Pour 2 cups milk over 1 cup cornmeal, add 1 saltspoon salt, 2 tablespoons finely chopped suet, 1 cup brown sugar, 2 tablespoons fine breadcrumbs and 2 well beaten eggs. Stir in sliced apples, add 1 level teaspoon of carb. soda dissolved in 1 tablespoon boiling water, mix all well together and pour into a generously buttered basin. Cover and steam 3 hours. Serve with custard or sweet white sauce.

Apple Conserve—Make a syrup by boiling 2 cups loaf sugar and 1 cup water for 10 minutes; pare and core 6 apples. Cut each into 8 pieces and drop into boiling syrup. Peel a navel orange, remove pith, chop coarsely, add to the boiling apples and cook carefully 25 to 30 minutes, then pour into small glass jars and store as any other preserve.

Apple Loaf.—Those who make their own bread will find this a delicious recipe. When making a batch of bread, leave enough dough to make a small loaf, and work into it 1 tablespoon butter, 2 tablespoons castor sugar, a pinch of powdered cloves, and 2 well beaten eggs, add sufficient flour to make a light dough, and set to rise in a warm place until twice the size. Divide into 3 equal pieces and flatten each piece out to fit an oblong bread baking tin. Well butter the loaf tin, put the first layer of dough in and cover with a good layer of finely chopped cooking apples; cover with the second layer of dough, then more apples, and lastly a third layer of dough. Put in a warm place to rise to the top of the tin. Brush lightly with egg white, shake castor sugar over and bake in a good oven for 1 hour until brown. Serve hot with brown sugar and

cream or treacle sauce; or cold cut into slices well buttered; or with honey served separately. Excellent fare for a picnic hamper.

Baked Apple Dumplings.—Peel 6 medium-sized apples very thinly and core them. Do not cut them up. Put sugar and cloves in each apple and roll pastry around each one. Place on greased tin and bake slowly for ½ hour.

Apple Pancakes.—2 eggs, 2 cups milk, 1 cup minced apples, 1 tablespoon sugar, 1 cup flour, 1 teaspoon baking powder. Beat eggs well, add milk, and gradually add flour to a smooth batter. Beat well and add sugar, apple and baking powder. Fry in a hot buttered frying pan; dust with sugar and serve.

Baked Apple Pudding.—Well butter a pudding basin and sprinkle freely with brown sugar. Prepare a short crust and line the basin with this. Fill the basin with apples, sprinkle with sugar and lemon juice and place a layer of pastry on top. Bake in hot oven and serve with sweet sauce.

Apple Snowballs.—The remains of a cold rice pudding, 4 or 5 apples, castor sugar. Peel and core apples and coat them with the mixture, which must be thick to mould round the fruit. Tie these in cloths or carefully place them in a steamer and cook for about ½ hour until the apples are cooked through. Place on a hot dish, sprinkle very freely with castor sugar, and serve with a little melted red currant jelly poured around.

Apple and Fig Roly Poly.—2 or 3 apples, 2ozs. figs, 2ozs. sugar, pinch of nutmeg, ½lb. suet pastry, peel and core apples and cut the figs in strips (after being soaked if dry figs are used). Prepare the suet crust, roll this out and place apples and figs on it. Roll up and tie in a scalded cloth. Boil 2 hours. Serve with white sauce.

Sweet crust for Top of Apple Pudding.—6ozs. fine bread crumbs and 4ozs. sugar. Arrange very closely in a piedish the apples, peeled and cored, with sugar. Spread the mixture of breadcrumbs and sugar upon the apples, smooth it down firmly, sift some sugar over the surface and bake in a quick oven about ¾ hour.

Apple and Rice Meringue.—1 cup rice, 1 gill milk, 1 dessertspoon sugar, 1 egg, 1 teaspoon butter, apples. To the well boiled rice add the thick yolk of egg, butter and sugar. Stir over fire until quite hot, but not boiling. Add the well beaten white, keeping a little back to decorate with. Put some stewed apples at the bottom of the dish. Put some rice mixture on top and decorate with unused white of egg. Set in oven until a pale brown.

Bird Nest Pudding.—6 large apples, 1 teaspoon cinnamon, 1 tablespoon butter, 3 eggs, 2 teaspoons flour, 1 pint milk. Peel and core apples. Cut in half and make hole in centre. Fill with paste made of cinnamon and butter. Put in dish. Pour over batter made of eggs, flour, and milk. Bake 1 hour.

Apple Tapioca.—1 teacup fine tapioca, 1lb. apples of uniform size and a few cloves. Wash the tapioca well, drain and soak overnight in 1 pint of lukewarm and slightly sweetened water. Core the apples without peeling or cutting, stick a clove into each apple and place them in a piedish. Pour the soaked tapioca over the apples and bake until tender. Serve hot or cold, with milk and sugar, cream or custard.

Fried Apples for Pork Curries, or Sausages.—6 apples, frying fat. Peel and core the apples and cut across in thick rings. Fry in hot fat for 5 minutes. Drain and serve in a hot dish.

Apple Jelly.—6 large apples, ¾lb. sugar, ½ pint water, 1 lemon, a few drops cochineal, 1oz. leaf gelatine; peel, core and stew apples in the water, add grated lemon rind and juice. Add sugar and rub the pulp if lumpy through a sieve. Dissolve the gelatine in a little warm water and stir into the apple mixture. Add also the cochineal. Place in a wetted mould and allow to set. Turn out and serve with cream.

Apple Cheese Cakes.—1lb. apples, ¾lb. sugar, 1oz. butter, 2 eggs, a little grated lemon rind, ½lb. good pastry, prepare the pastry and line some patty pans with this. Prepare the apple mixture peeling, coring and stewing the apples. Add the sugar, butter, eggs and lemon rind, and stir well. Place a little of the mixture in each pastry case and cover with narrow strips of pastry. Brush with white of egg and bake for 20 minutes until nicely browned.

Apple Nut Cake.—2 cups flour, 1 cup sugar, ½ cup butter, 1½ cups warm stewed apples (unsweetened and dry), 3 dessertspoons cocoa, 2 level teaspoons bicarb. soda, ½ teaspoon each of grated nutmeg, cinnamon and mixed spice, ½ cup each of raisins and chopped walnuts. Cream butter and sugar, dissolve 1½ teaspoons soda in hot apple pulp and add other ingredients, and lastly mix in flour with level teaspoon cream tartar and other ½ teaspoon soda. Put into a well greased shallow tin and bake ¾ hour in moderate oven.

Apple Tart.—2 tablespoons butter, 2 tablespoons sugar, 2 tablespoons water, 1 egg, 2 cups S.R. flour, pinch salt, halve the mixture, roll out and spread stewed apples on paste and roll the other half of paste and put on top. This is an excellent tart and can be served at afternoon tea cut in diamond shapes with whipped cream on top and good for lunches as it keeps so moist.

Apple Sandwich.—Grate a ripe apple finely, blanch and halve some almonds, mix with the apple and arrange between slices of buttered bread, add a little whipped cream if desired.

Cream and Apple Sandwich.—2 cooking apples, 1 tablespoon chopped walnuts, 3 tablespoons cream, white bread and butter. Peel, core and cut apples into thin slices. Place on buttered bread. Cover with cream, sprinkle with walnuts and pair.

Pickled Apples.—Something rather different from the usual run of pickles and more pleasing to the palate can be made with cooking apples. About 1½ dozen small apples; allow 1½ quarts vinegar, 3lbs. sugar, 1oz. whole spice, 1oz. whole ginger (bruised and broken), 1 teaspoon cloves, 1 or 2 blades mace, boil the vinegar with the sugar and spices (tied in muslin bag), put in the apples and cook gently, not letting them break when they are cooked. Lift them out and place them in a large jar, pour the spiced vinegar over them and set the bag of spice on top, tie down when cold.

Apple and Tomato Chutney.—6lbs. tomatoes, 1lb. sugar, 4 large apples, 1 pint vinegar, 1 tablespoon salt, ½oz. cayenne pepper, 2ozs. garlic, ¼oz. cloves, 1½ozs. white ginger, boil 3 hours until thick.

Apple and Fig Jam.—Allow 3lbs. of preserving sugar to 1lb. of figs, 3 pints of apple juice, and 1 pint water. Boil figs slowly in water, for 1½ hours, add the apple juice and sugar, and stir the mixture well until every particle of sugar has dissolved. Continue to boil it until a little jellies when tested on a plate.

Apple Cider.—Take 8lbs. apples, 1½galls. water, 1 heaped cup soft sugar, ½ teaspoon compressed yeast. Cut apples into small pieces and add water, bring to the boil, and immediately place in a cool room to cool. When lukewarm mix the yeast with 1 cup of the warm liquid and add to the mixture, leave for two days, then strain through muslin, add sugar and stir well; when dissolved, bottle and tie down corks. Yeast may be omitted, in which case add raisins to each bottle to hasten the action. Will be ready for use in two days.

An *apple* eaten before retiring at night is excellent for removing all food from the teeth.

There are those who feel so enervated during the extreme heat that the idea of food is revolting, but a few pieces of fresh fruit will usually tempt them. An apple is an excellent substitute for meat, and much better than a meal taken under protest.

BREAD MAKING ON THE FARM.

[MRS. M. CHRISTOPHERSEN, Wilmington.]

The principal factor in making good bread is good yeast and good flour. Most of the recipes are too complicated, and take too much time and labour for the busy housewife. The following method is most simple, and gives good results.

Yeast.—When cooking potatoes for dinner, take out 1 medium-sized potato, and mash it, and add 1 cupful of water that the potatoes were boiled in. Leave until cool. Pour 1½ cups of boiling water on one heaped tablespoon of hops and boil 4 or 5 minutes. Put 1 tablespoon each of flour and sugar in a basin and mix, then strain the boiling

hop water on to it, stirring while pouring it on. Allow to cool, then mix potato and hop mixture together, put in yeast bottle, and tie cork down. The yeast should be ready for use in about 6 hours.

Bread.—6lbs. flour, 2 tablespoons salt, 3 pints warm water (or half-separated milk), 2 cups of yeast. Sift flour and salt into dry, clean bread pan. Make a well in centre of flour and gradually stir in liquid and yeast. Mix into nice dough and then knead for 20 minutes. It should then feel smooth and springy to the touch. Cover up warmly in winter and leave to rise overnight (in summer time mix the dough in the morning, on account of it rising so much more quickly).

In the morning knead it down, taking care not to mix more flour into it—just enough to keep the hands from sticking. Divide into four, and form into loaves. Put into warm greased bread-tins (lightly floured). Place tins on oven door, cover with cloth, and leave to rise for an hour, or until it has doubled its bulk and the tin feels light. About 15 minutes before the bread is ready for the oven, close oven door and heat; then bake for 1 hour. When cooked, the bread should give a hollow sound when tapped on the bottom. The above quantity of yeast is sufficient for the bread recipe and for the following yeast cake recipe.

RECIPES.

Yeast Cake.—1lb. flour, pinch salt, 3ozs. or 4ozs. butter or dripping, 5ozs. sugar, 3ozs. or 4ozs. sultanas, 1 cup milk, essence of lemon, ½ cup yeast, 1 or 2 eggs. Add little more milk if only 1 egg is used. Sift flour and salt, rub in shortening, add sugar, fruit, make milk hot and add to beaten egg. Add yeast, pour into dry ingredients and mix thoroughly. Cover same as bread and leave to rise overnight. In the morning put into greased flat dish and leave to rise 1½ hours before baking. When ready to bake, brush top over with thin cream and sprinkle the following mixture on top:—½ cup sifted flour, ½ cup sugar, 1 teaspoon of cinnamon; rub in 2ozs. or 3ozs. of butter—enough to make it crumbly. Bake 40 minutes.

GIVING THE CHILDREN A BIRTHDAY PARTY.

[MRS. J. BURNS, Wepowie.]

A birthday party! What colour and gaiety the word conjures up in childish minds. The balloons, paper caps, and gaily set table need cost very little in money; just a little time and trouble and the food need not be rich to achieve success. It is the way it is served and the little finishing touches that are in keeping with the party atmosphere. The first thing is the birthday cake. Turn the cake into a merry-go-round. Swirl the icing, pink for choice, round the top of the cake, which for small children should be a plain sponge. In the centre the pole is a striped candy stick, and from it run pink ribbons, which are stuck down to the edge with gum drops. At the end of each ribbon —as though marching round—place a tiny toy animal, which later can be souvenired. A large circle of cardboard underneath the cake is covered with white paper, and here the candles are fixed. A variation of the foregoing is a gay maypole with little dolls instead of animals.

When choosing the "menu" for the party, here are a few novel ideas that will appeal to them. For the sandwiches, butter bread and make a sandwich of banana sprinkled with sugar and a little lemon juice, butter on top, and sprinkle with "hundreds and thousands."

Little cakes are always a favourite. Recipe: Cream about 1 cup sugar with ¾ cup butter, add 2 beaten eggs, ½ cup milk, 2 cups S.R. flour; cook some of the mixture in crinkly cake cups. Ice with white icing, then decorate the cakes to represent faces. This will require a little cochineal for the mouth and cheeks, brown for eyes and eyebrows, a little saffron or brown for the hair. Make a number of different types of faces. Bake some of the mixture in boat-shaped patties, ice in many colours, and fit them with toothpick masts and gay little paper sails, on which print the names of the wee guests.

Orange Baskets.—Select nice ripe oranges, cut a small ring of skin off the bottom to make them stand firmly; then cut to form a basket. Remove the pulp of the orange, being careful not to break the handles; then fill with jelly or any other filling. The orange pulp may be used for the fruit salad. Home-made sweets and drinks are always best. For a novelty make little animals out of toffee. The small celluloid shapes can be bought for one penny. Cut these in halves and grease well, and when the toffee has cooled a little, pour it in. Chopped nuts and cocoanut may be added for variety. Birthday presents loaded in amusing little carts driven by quaint animals cause much pleasure. These can be made at home in a few hours and cost practically nothing. The only materials required are cardboard boxes, pickle corks, a few pieces of three-ply wood or deal for shafts and axles, paint and glue. The cart is the lid of a chocolate box, measuring about 5in. x 3in. A strip of cardboard with the ends bent over is fitted for the driver's seat. Axles are made from the wood 4in. long and the shafts of the same, nailed or glued to the axle. Pickle corks cut in halves form the wheels. Cut small circles of cardboard and nail through these when attaching the wheels, as the corks break away easily. Do not fasten too tightly or they will not rotate properly. Paint the cart inside and out with red paint, wheels are gold. Paint wheels, axles, etc., before fixing to cart. The horse is cut out of strong cardboard, painted and fastened to cork stands. Suitable designs can be traced from picture-books. Quite a number of different designs may be made. For a small children's party it is neither necessary nor desirable for the guests to dress in party finery. A dainty everyday frock is more appropriate for the occasion. Many a child's afternoon has been spoilt because the mother's warning of "You mustn't play and get your pretty frock dirty," was ringing in her ears.

DRESSMAKING.

[MRS. E. J. FRANCIS, Wirrabara.]

Dressmaking is an art every woman should try to accomplish, even if only in the simpler forms. Besides the joy of creating the garment, perhaps designing it to suit personal tastes, there is the satisfaction of money saved. Once the essential seams and measuring are mastered, dressmaking will be a pleasure.

The greatest aim in dressmaking is to make a simple dress beautiful by expressing simplicity, style, and personality, and to master dressmaking, one must start with a plain garment, learning to cut, fit, and assemble so that the lines will harmonise and suit the individual. The paper patterns that come with the various fashion books are a great help to the home dressmaker, but as these are only made in stock sizes it is often necessary to alter them to suit other measurements. The chief essential in dressmaking is accuracy, and it is necessary to know how to take measurements and to alter patterns to correspond. Time spent at this stage is amply repaid in the finished garment. When taking bust, hip, waist, and armhole measurements be careful not to draw the tape too tightly, as these measurements must be "easy." A good plan is to place the tape just tightly enough to place a finger between tape and figure.

No one fashion can be relied upon to suit every type of figure, but it helps in suggesting and gives an idea of the prevailing fashion; so when accustomed to the outlines of the pattern, alter the style if necessary to suit the figure. A very little alteration may make it more becoming.

When contemplating a new dress think first of the occasion on which it will be worn, then buy material and pattern to correspond. Before cutting out the garment be sure that the measurements are right, and make any alterations in the pattern before placing it on the material. When alterations are done, place the pattern carefully on the material, pinning it into place, and cut carefully, allowing ½in. to 1in. for seams, according to the desired finish. Mark all notches, as these are a great help in making up the garment.

Pin or tack together first the shoulder dart and seam, then skirt to bodice, then side seam, and try on, as any slight alterations are easier to do before the stitchings are done. If the material is apt to fray or stretch out of place, run a thread around the

neck and armholes to keep in shape. When cutting striped material, care should be taken not only in placing the pattern on the material so that the stripes match, but also the effect of the stripes on the figure. When a seam is made slightly on the bias, the stripes meet at an angle or V, and a broad V will have a broadening effect, while a narrow V will tend to slenderise. Care must also be taken in cutting figured material to keep the design as unbroken as possible, so it is best to choose a pattern with few seams. Before cutting chiffon or georgette, it is helpful to pin or tack the material to paper, place the pattern on the material, and cut through both material and paper.

It is advisable to shrink all materials before cutting, as in pressing a damp cloth should be used, and if not shrunk beforehand, material will shrink where the heaviest pressing is done, causing puckers to appear. Linens or any washing material may be dipped in water and hung dripping wet on the line by one selvedge. When dry, roll or fold carefully, pressing out any peg marks. Woollens may be shrunk with a damp cloth and a hot iron. Place material right side down, then cover with damp cloth and go over lightly with a hot iron; repeat this process until the length of material is done, wringing the cloths each time to ensure uniform dampness and to prevent puckers.

A flat seam is better for most tailored garments; it lies flatter and sets better. There are several ways of finishing a flat seam according to the material. Flannel or a material that does not ravel may be pinked out or left plain, but one that ravels should be turned back at the edges and stitched or over-sewn with linen or light-weight woollens. The edges may be stitched or sewn together. Material bound buttonholes are usually bound with the same material as the garment, but if used as trimming, braid, silk, or contrast may be used. Before applying the binding, an interlining, either of calico or lightweight canvas, should be placed between the two thicknesses to give added strength. A piece of material about 2in. wide and of a length to permit it to extend $\frac{1}{2}$in. to $\frac{3}{4}$in. each end of the buttonhole opening will be needed. Press well;

1935 CALENDAR 1935

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1936 CALENDAR 1936

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● FULL MOON

press all seams as they are done, always pressing lengthwise of the seam. Instead of pressing seams in velvets or woollens having a nap, steam them open by running them over the edge of an inverted iron that has been covered with a wet cloth.

A garment that has been well pressed in the making will need very little pressing when finished.

PASTRY.

[MRS. BURY, Wilmington.]

There are three kinds of pastry:—1. Short crust, so called because it is short or crumbly when cooked. It is used for Cornish Pasties, Black Currant Tarts, Macaroons, etc., and all fruit pies except Apple Pie. 2. Flaky pastry, so called because it appears in flakes or layers when cooked. It is used for Tarts, Apple Pies, and all Meat Pies *except Cornish Pasties. 3. Suet crust is made with Suet or Shortening, and is used for* boiled puddings, boiled dumplings, &c.

SOME RULES FOR MAKING PASTRY.

1. Pastry should be made in a cool, airy place, put on a clean, cold oven slide and cooked in a hot oven.

2. See that the oven is hot for flaky or short crust, and the saucepan of water water boiling for suet crust.

3. Sift flour, salt, and baking powder, to remove lumps, to mix thoroughly and to enclose the air for short crust.

4. Rub fat or butter into flour with the tips of the fingers, raising fingers out of the flour so that air may mix with the flour as it falls.

5. Handle pastry as little as possible, but lightly and quickly.

6. Do not knead short or suet crust; use as little water as possible—the dough must be stiff and in one lump.

7. Make dough for puff pastry fairly moist, and knead it well before adding the fat.

8. When sprinkling board and rolling-pin, use just sufficient flour to prevent dough *from sticking.*

9. Roll pastry with a firm, even pressure away from you—never sideways.

10. When cutting pastry, make a clean cut; leave no ragged edges.

11. Pastry should not be put over the contents of a pie whilst it is hot; the steam makes the under layers of pastry sodden.

12. While pastry is in the oven open the door very seldom; never within the first five minutes.

13. Small holes should be made in pastry that is the covering of meat pies, to allow gases from the meat to escape.

For short crust half S.R. flour and half plain makes the nicest pastry, as follows:—¼lb. plain flour, ¼lb. S.R. flour, ¼lb. fat or butter, pinch salt, and 1 gill water. Sift flour and salt and rub fat into flour with tips of fingers. Mix into a stiff dough with water, place on a lightly floured board, and roll into shape required.

Cornish Pasties.—½lb. steak, 2 small potatoes, 1 small onion, and 1 slice of turnip, ½ teaspoon salt, ½ teaspoon sugar, 10 shakes of pepper or ¼ teaspoon. Cut meat and vegetables into fine dice, add pepper, salt, &c., and mix well with a little water and a little flour. Bring to boil to thicken and set aside to cool. Cut the short crust into rounds the size of a saucer. Put a large spoonful of the mixture on to each round, wet half side with milk or water and fold over and shape pastry into a half-moon; pinch the edges into a frill. Prick with a fork to allow steam to escpe. Glaze with a little milk mixed with yolk of an egg. Place on a cold oven slide and bake in a hot oven
pinn... 20 minutes. Serve on a hot dish, and garnish with small sprigs of parsley.
desired fi...*try.*—½lb. plain flour, ½lb. hard butter, pinch salt, squeeze of a lemon, less
Pin or tack ... a pint of water; sift flour and salt and add lemon juice mixed with
seam, and try o...nto stiff dough not too dry or too wet. Roll out twice as long as wide.
done. If the mat...*ut of butter with a cloth. Place on one-half of paste and fold over*

the other half, and press edges together. Roll out into an oblong, fold in three. Repeat this three times, allowing 10 minutes between each folding and rolling. The object of cooling between the rolls is to keep the butter and flour distinct and in separate layers. Roll out and cut into tarts or whatever is required. Glaze with yolks of egg and milk.

For sausage rolls, roll out much thinner than for tarts. Mince the meat and mix with pepper, salt, and a little sugar and just a little water and flour to thicken. Bring to boil and set aside to cool. Take about 1 teaspoon of meat and put on pieces of pastry twice the size of meat. Wet one half side and fold over the other side, showing the cut side. Glaze with milk and egg, put on cold slide, and bake in a hot oven 20 minutes.

Sultana Slices.—Make ½lb. short crust to which has been added 1 tablespoon sugar. Roll out about 12in. square, mark half with back of knife and spread with the following mixture:—2 tablespoons sultanas, ½ tablespoon spice, 1 tablespoon sugar, and 1 dessertspoon warm water and a few drops essence of lemon. Blend well and cover half the paste with the mixture; fold over and bake in a fairly quick oven until golden brown. When cold cut into squares.

Delegates at the Women's Session of the Upper North Conference, Booleroo Centre, 17th July, 1935.

TRAINING AND CARE OF CHILDREN.

At the meeting of the Warcowie Branch, held on 16th April, Mrs. E. Jarvis read a paper on the above subject. She said:—The training of the child should begin in early infancy. The child should have good nourishing food and be fed regularly, and as soon as it can sit up be given something to play with. From infancy onwards a child needs careful attention, or otherwise it may form bad habits. As soon as the child can ask for what it wants, it should be taught to say please and thank you and wait patiently for it. Children should go out of doors to play as much as possible. Some seem to be more destructive than others. It is the parents' duty to teach them to build up, rather than destroy. Most children are selfish, and it is the parents' task to teach them not to be greedy.

Parents must be firm; never allow the child to "answer back," nor have all its own way. Some children are hard to manage, needing a firm hand to bring out the best in them, whilst others need gentle handling. Some children are afraid of the dark, and should be pitied, but never punished. Mothers should try to show such children that their fears are groundless; and encourage them, rather than scare them. Teach them to be honest and to do a deed of kindness for others. It helps them to be unselfish. When a child reaches the school going age, it must be taught to join in and play games with other children. As the child grows, he should be given some work to do at home. Parents should if necessary, sacrifice some of the pleasures of life to help their children achieve his or her life's ambition. (Secretary, Miss L. Martin.)

JAM COMPETITION.

Twenty-three members attended the meeting of the Penola Branch held on 1st May, which took the form of a Jam Competition. Mrs. R. Black judged the entries and made the following awards:—First and second, Mrs. T. Oswald; third, Mrs. J. Neilson. (Secretary, Mrs. Edith Kidman.)

FANCY WORK.

"Fancy Work" was the subject of the paper presented by Miss L. Martin at the May meeting of the Wareowie Branch. "The blending of the colours," she said, "and neatness are the two main factors to remember. Neatness depends largely on the kind of cotton and needle used. Always use a fine needle. The kind of cottons will vary with the material being worked. For light weight materials, linen or cotton stranded gives the best result. Poplin looks nicer worked in a silky thread. There are numerous stitches to choose from, but the following list is suitable for various patterns:—

Chain stitch for initials, filling in and sometimes stems or lines.

Stem stitch for stems, but can be used for "blocking" initials or outlining.

Cross stitch very seldom used, except on patterns printed purposely for the stitch.

Satin stitch for filling in leaves and petals of flowers. Instead of always working the stitch the full width of the leaves or petals, a long stitch and then a short stitch can be worked. This looks very effective on a pattern which may look clumsy if worked in the usual manner.

Lazy Daisy for flowers and leaves.

Buttonholing for flowers, especially those of a Cineraria, Ranunculus or Hollyhock designs. By working from the centre of the leaf to the edge a vein is formed down the centre.

French Knots mostly used for centres.

Worm stitch, the same as 'French Knots,' but a long stitch is used instead of a short one. This is used for Rosebud designs and can also be used for Lazy Daisy. For single Lazy Daisy one stitch is all that is necessary. These are joined in such a way as to form a loop.

Never use double thread nor a crewel needle. The double thread is apt to tangle and spoil the appearance of the work. As the eye of a crewel needle is larger than the point of the needle, one is likely to fray or break the thread while trying to pull the needle through the stitches wound on the needle point. The size of the 'Long Knots' varies according to the number of twists on the needle. The whole effect of an article is often spoilt by an unsuitable edge. The depth of the edge should vary with the size of the garment. For example, from a narrow edge for a d'oyley, to a deep lace for a supper cloth."

SIDE LINES.

The Hon. Secretary of the Yurgo Branch (Mrs. R. Sanders) read a paper at the meeting held on 1st July.—Any member of the family can lend a hand with the vegetable garden, and it is an asset to the home to have fresh vegetables daily. When there is more than needed, they can be used up in pickles, preserves and sauces. Again they can be sold to the store or neighbours, and so help to bring in a few shillings.

The fruit garden needs the attention of an experienced man who understands pruning, ploughing and mulching, but anyone who is able to have a fruit garden is well repaid for this trouble by having the pantry filled with jams, jellies and preserves. Even with only a few trees, I have not, for the last two years, bought one tin of jam or a bottle of preserves.

POULTRY.

Poultry raising is a profitable sideline. Fowls are easily reared on a farm, and when allowed to roam, need very little to keep them. To get the best results, however, poultry should have a hot bran and pollard mash in the mornings, shelter from cold winds in winter and also shade in summer. Gather the eggs daily in winter, twice in summer where exposed to the sun. Send them to market fresh and clean to get best results. Ducks are very easy to rear and sell well for table use, but do not pay to keep for egg laying. The Muscovy-Pekin makes a good table bird, and the lighter breeds such as Indian runner Kah-ki Campbell, are the best laying strains. Turkeys are more delicate, the first month they want a sheltered place where the sun shines early in the morning, and must be fed well. Stale bread soaked in milk and mixed with pollard and a little bran until crumbly for the morning feed, and crushed wheat during the day makes a suitable feed. The best months

to hatch are July, August and September. July hatched birds should be ready for Christmas market; August and September hatchings should be sold at Easter. Once a turkey is full grown, send it to market.

Cows are disliked by nine out of ten people on the farm, although the products from them almost equal the half of one's living, when it is realised how many dishes can be made from milk, butter and cream. This is work a woman or girl can do better than most men. Cows should be the very best that it is possible to buy. Always leave the calf two days with the mother, the first milk is very beneficial and necessary. When the calf is taken away, have it right out of its mother's sight, she will soon forget it and settle down to her duty. The calf should be fed two or three days on new milk, and the latter gradually mixed with separated milk. By the time it is a fortnight old it will do on separated milk with a little linseed added with hot water. Never feed calves on cold milk. Unless it is intended to keep these young animals, market them at about 2 months old, right off the milk.

Pigs.—Where cows are kept pigs are necessary to use up waste milk, and all scraps. This is not a woman's or girl's work. Where a number of these animals is kept the feeding of them is too laborious for the women-folk. The farm is not complete without a pig, and all women should know how to cure a pig for bacon, and have a supply ready for winter months. This item again saves the farmer still more expenses.

CLARE.

The April meeting was devoted to "Jam Recipes," 30 members being present. Each member exhibited a sample of jam or jelly together with its recipe.

On 4th May, 33 members took part in a "Lend a Hand" afternoon. Knitting difficulties, smocking, mesh work, &c., were some of the topics discussed. (Secretary, Mrs. A Pollock.)

THE TOMATO AND ITS USES.

Mrs. Stewart read a paper on this subject at the April meeting of the Taplan Branch:—The growing of successful crops of tomatoes, at one time so easy, of late in many districts has become quite a difficult matter, owing to the presence of so many diseases. The most destructive disease of tomatoes is "Tomato Wilt." The effect is the destruction of foliage. Healthy plants suddenly collapse and the leaves shrivel. This can be prevented by regularly spraying the plants every fortnight with Bordeaux mixture. They should be sprayed from the time of planting until the fruit is ready to pick. In the beginning of September sow seeds of Early Red and Early Dwarf, and they should be ready for planting out about six weeks later. With favourable conditions one should be pickling tomatoes a week before Christmas. If the soil has been used before, dig up a few months beforehand. A little lime and wood ash helps to sweeten the soil. When the plants were put in, the roots were dipped in a weak solution of Condy's crystals, and a tiny pinch of sulphur placed in each hole. This has given wonderful results. Staking the plants is quite a good plan. In districts of hot climate, plenty of foliage must be left to prevent the sun from burning the fruit. For stakes, good stout sticks, 4 or 5 feet out of the ground are necessary. As they grow, the leading shoot should be tied with some soft material, such as raffia. The branches that grow from the axis of the leaves should be pinched off as they appear, and this will keep the plant to one main stem. As soon as it reaches the top of the stake, pinch off the top. This will throw the plant into bloom and induce a good setting of fruit. While the plants are young, they do not need too much water, but when the fruit has set water can be applied more liberally.

POULTRY AND COWS.

Following the discussion on the above paper, Mrs. Clarke, in the course of a paper "Poultry in Conjunction with Cows" said:—"Next to the garden, of all things amongst the ouside work connected with the farm, poultry and cows have most appeal for women. Not only does it mean a great help for the men, but it is also the main source of ready cash, and, indeed, it would be very hard with the women folk if they had no cream or egg money to rely on.

The most profitable way of utilising skim milk is to give it to fowls, either in the early morning mash or fed separately in the form of thick milk. Especially is it good for growing turkeys. Commence operations with a reliable strain of birds. Careful selection of males should be made, for it is from them and not the hens that the progeny depends. Pure bred White Leghorns are best, and these should be procured from a

reputable breeder. It is no use breeding table birds, the markets are too distant and freight would swallow up all the profits. If a utility fowl is required, then the Black Orpington is the one to select, or Australorps if obtainable. To get the best out of poultry, it is absolutely essential to have a pure strain, whatever the breed; 50 pure bred birds are far better than 100 mongrels. Cull heavily, and breed a couple of hundred birds per year. One can safely count on a half being roosters, and allowance must be made for many deaths amongst the chicks. One will be very fortunate to secure and rear 60 pullets from the original 200 chicks.

Eggs should be collected at least twice daily, any soiled ones wiped immediately with a damp cloth, and packed ready for market, big end up. Only by this method can one hope to get the top market value for eggs, which is usually anything from 2d. to 4d. per dozen more for export standard.

Early moulters should be discarded and either sold or fattened for the table. These are not winter layers, and it is no use breeding from them. It is the hen that is just beginning to moult and the ones that are still half naked that are the layers, and are probably laying right through the moult. It takes a hen six or eight weeks to get over the moult before she starts laying again, and the late moulter starts just as soon as the early moulter." (Secretary, Mrs. Flynn.)

OTHER REPORTS RECEIVED.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
			WOMEN'S.	
Rendelsham ...	3/7/35	7	Question Box	Mrs. Z. A. Bignell
McLaren Flat...	4/7/35	16	Demonstration..........	Mrs. B. Powell
Sheoak Log	2/7/35	29	Address—" Needlework "—Miss Mortimer	Miss K. Koch
Wirrabara......	16/5/35	24	" Dressmaking "—Mrs. Francis	Mrs. A. Curtis
Wirrabara......	20/6/35	27	Curio Afternoon	Mrs. A. Curtis
Balumbah......	*3/7/35*	*14*	*Replies, &c., Stock Ailments—H. D. Adams*	*Miss H. Jericho*
Clare	6/7/35	35	Annual Meeting	Mrs. A. C. Pollock
Wilmington	11/7/35	35	Annual Meeting	Mrs. P. Cole
Belalie	9/7/35	29	Annual Meeting. Quilting Demonstration—Mrs. Orchard	Mrs. E. L. Orchard
Narridy	11/7/35	42	Social	Miss B. J. Reynolds
Nelshaby	10/7/35	20	Annual Meeting	Miss A. M. Lawrie
Snowtown......	4/7/35	18	Annual Meeting	Mrs. A. Hocking
Maltee	4/7/35	7	Annual Meeting	Miss L. Bassham
Tantanoola	*3/7/35*	*12*	*Annual Meeting ....*	Mrs. Gus. Altschwager
Monarto South .	18/7/35	23	Annual Meeting	Mrs. F. W. Liebelt
Karte	30/5/35	—	Inaugural Meeting	Mrs. F. N. Atze
Karte	14/6/35	—	Social	Mrs. F. N. Atze
Karte	10/7/35	19	" Biscuit Day "—Mrs. Atze	Mrs. F. N. Atze
Penola	3/7/35	26	Butter Competition. Judge—W. H. Downes	Mrs. F. J. Kidman
Morchard	23/7/35	—	Combined Men's and Women's Branch Social	Miss F. A. Brown
O'Loughlin	*16/7/35*	*9*	*Annual Meeting ....*	*Mrs. E. E. E. Lutz*
Laura Bay	9/7/35	11	Annual Meeting	Miss T. E. Barnett
Wirrabara......	18/7/35	14	Conference Report	Mrs. A. Curtis
Kybybolite	11/6/35	13	" Rug Making "—Mrs. Harrison	Mrs. W. D. Kekwick
Kybybolite	16/7/35	9	Annual Meeting	Mrs. W. D. Kekwick
Kangarilla	18/7/35	11	Annual Meeting	Mrs. M. A. Steer